FIG. 1

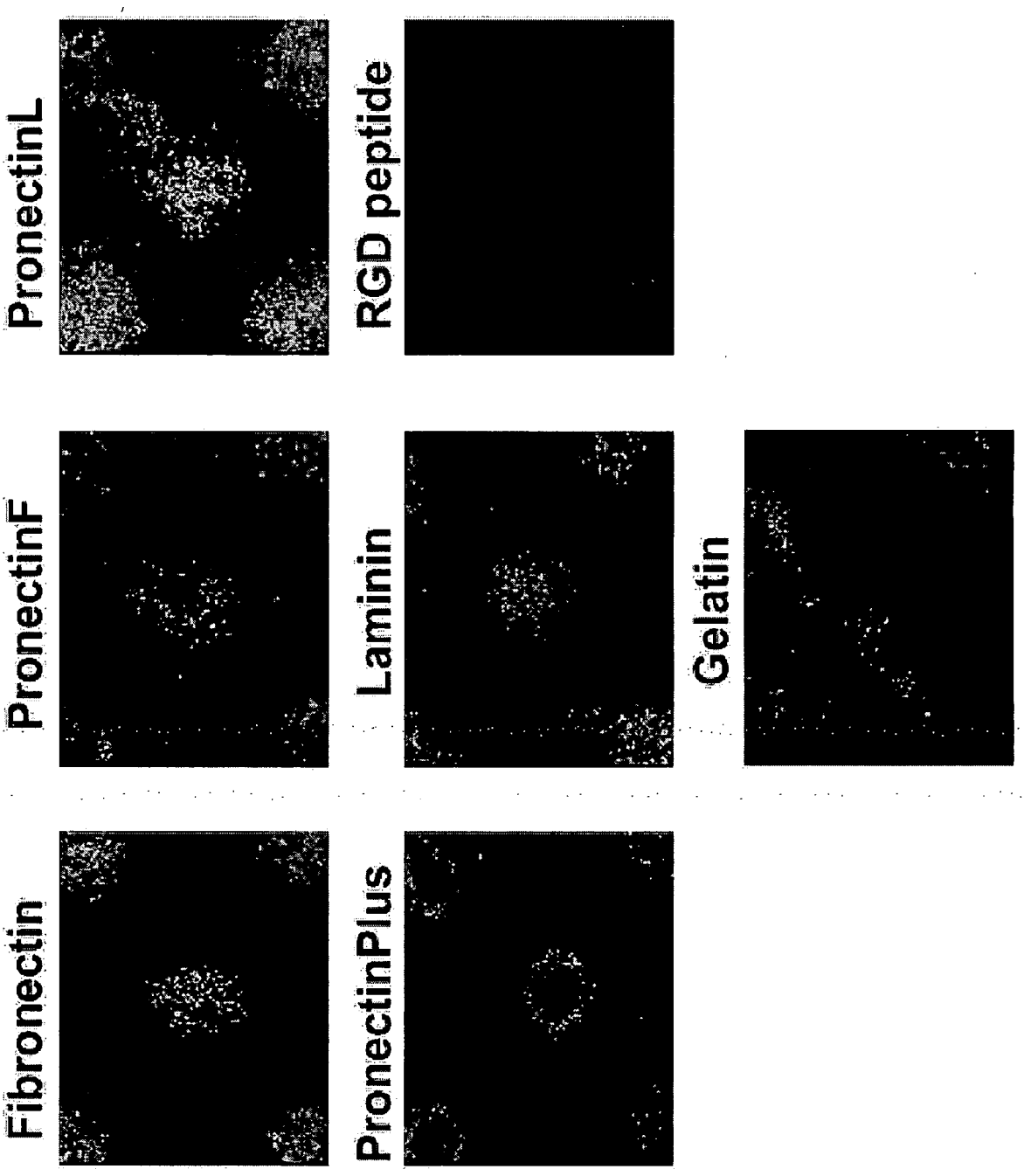

Fibronectin
PronectinF
PronectinL
PronectinPlus
Laminin
RGD peptide
Gelatin

FIG. 2

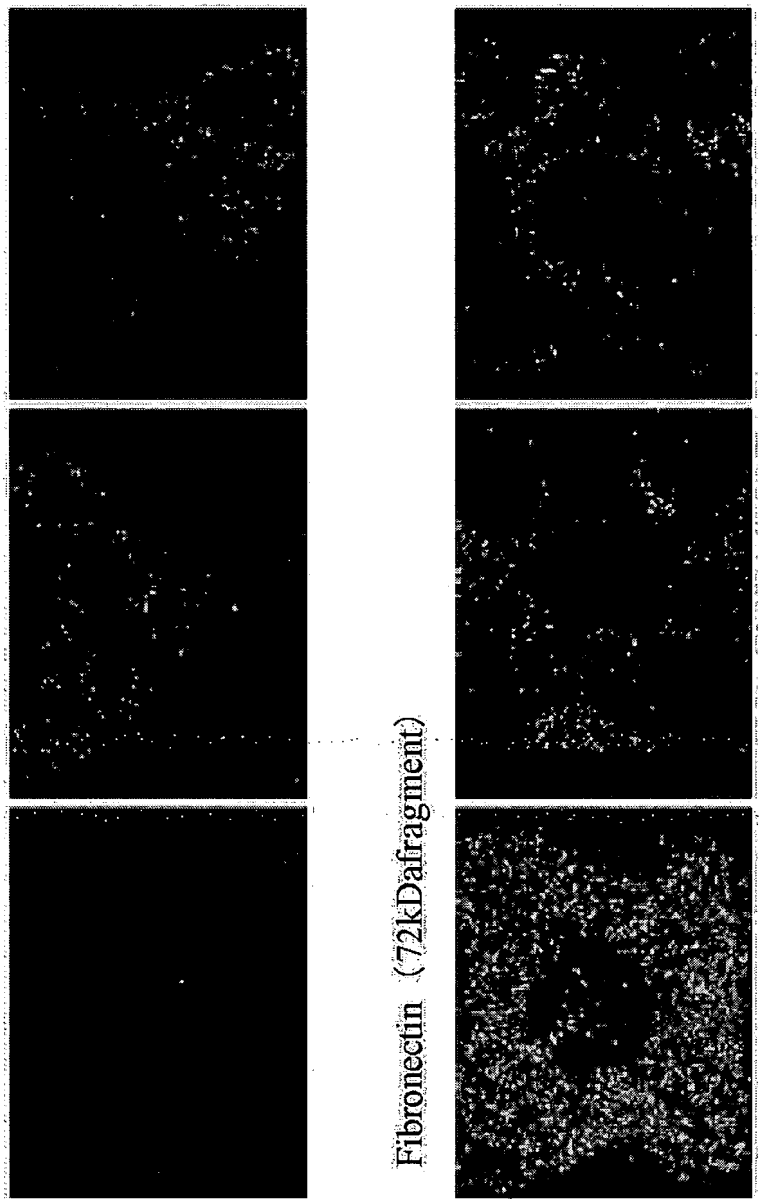


FIG. 3

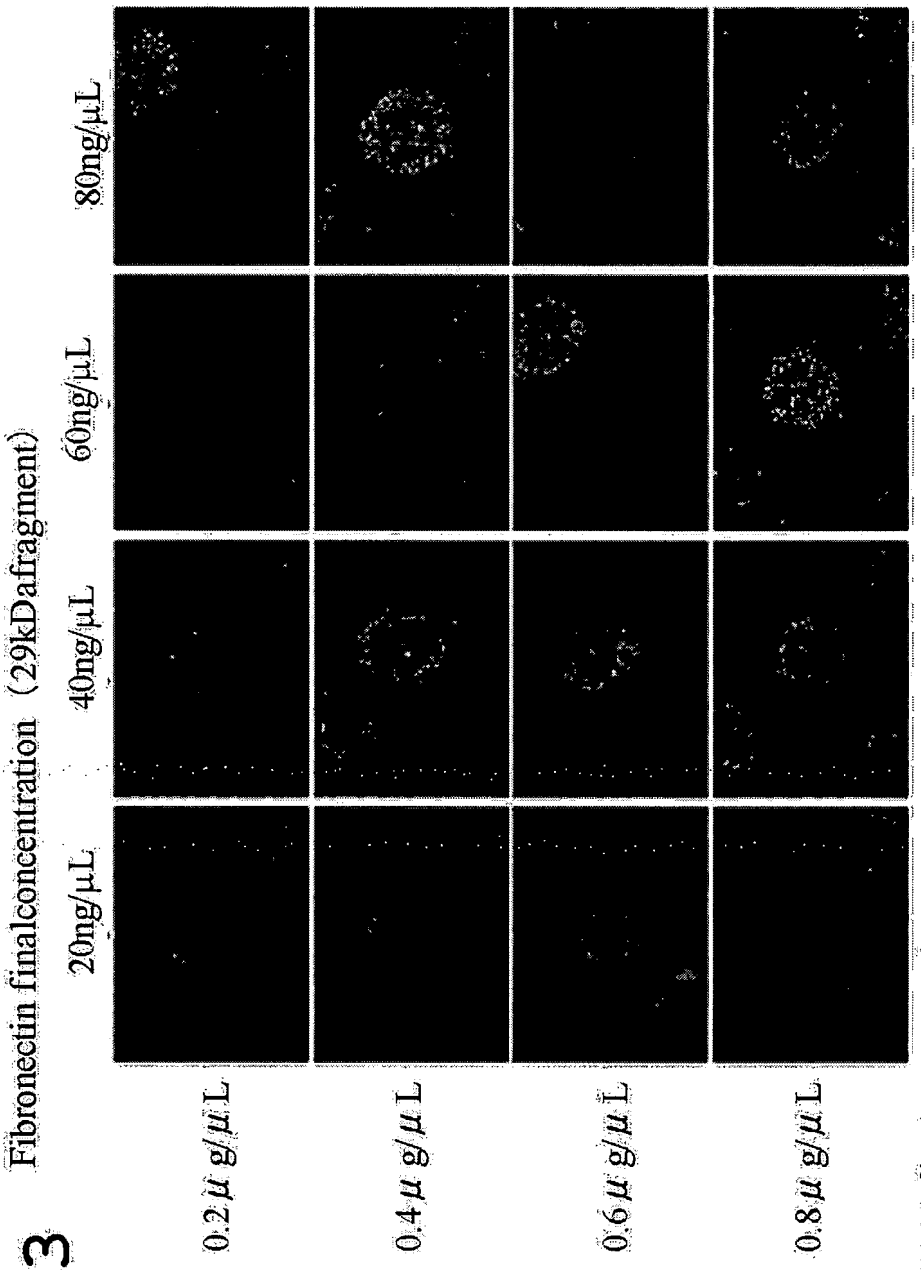
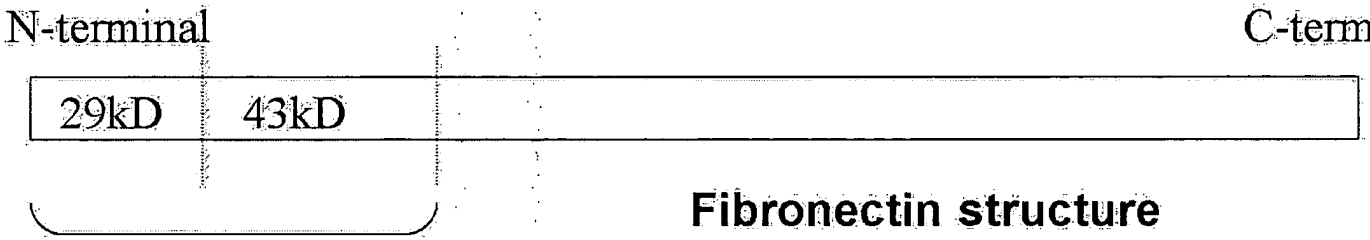

Fibronectin finalconcentration (29kDafragiment)
20ng/μL
40ng/μL
60ng/μL
80ng/μL
0.2μg/μL
0.4μg/μL
0.6μg/μL
0.8μg/μL
DNA finalconcentration

FIG. 4



Fibronectin structure

Fragments	Binding molecules
29 kD	Actin, Heparin, Fibrin, etc.
43 kD	Collagen (Gelatin)

	29 kD	43 kD	72 kD
TF efficiency	◎	○	◎
Cross-contamination	**none**	**some**	**some**

FIG. 5

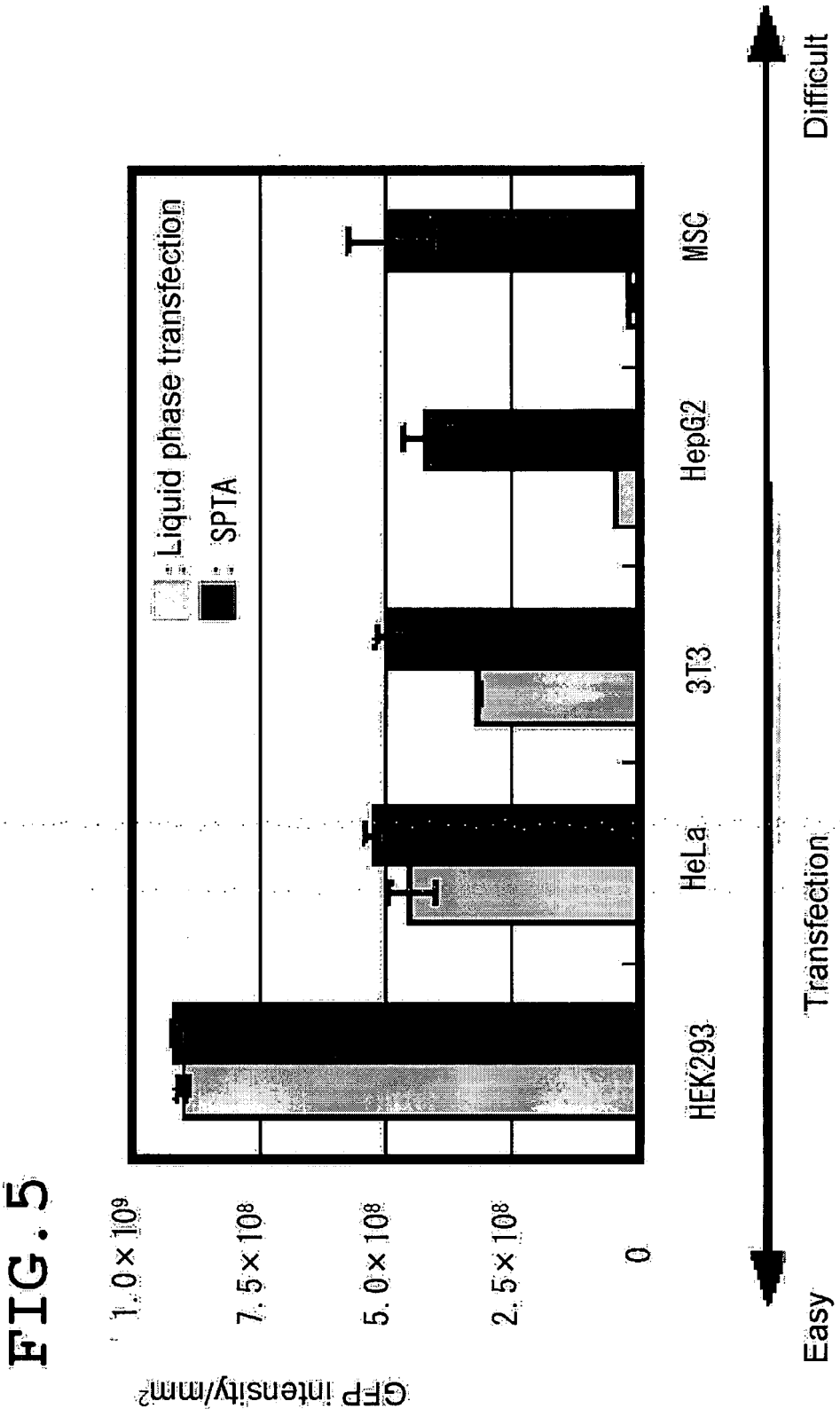

GFP intensity/mm²
1.0×10⁹
7.5×10⁸
5.0×10⁸
2.5×10⁸
0
Liquid phase transfection
SPTA
HEK293
HeLa
3T3
HepG2
MSC
Easy
Transfection
Difficult

FIG. 6

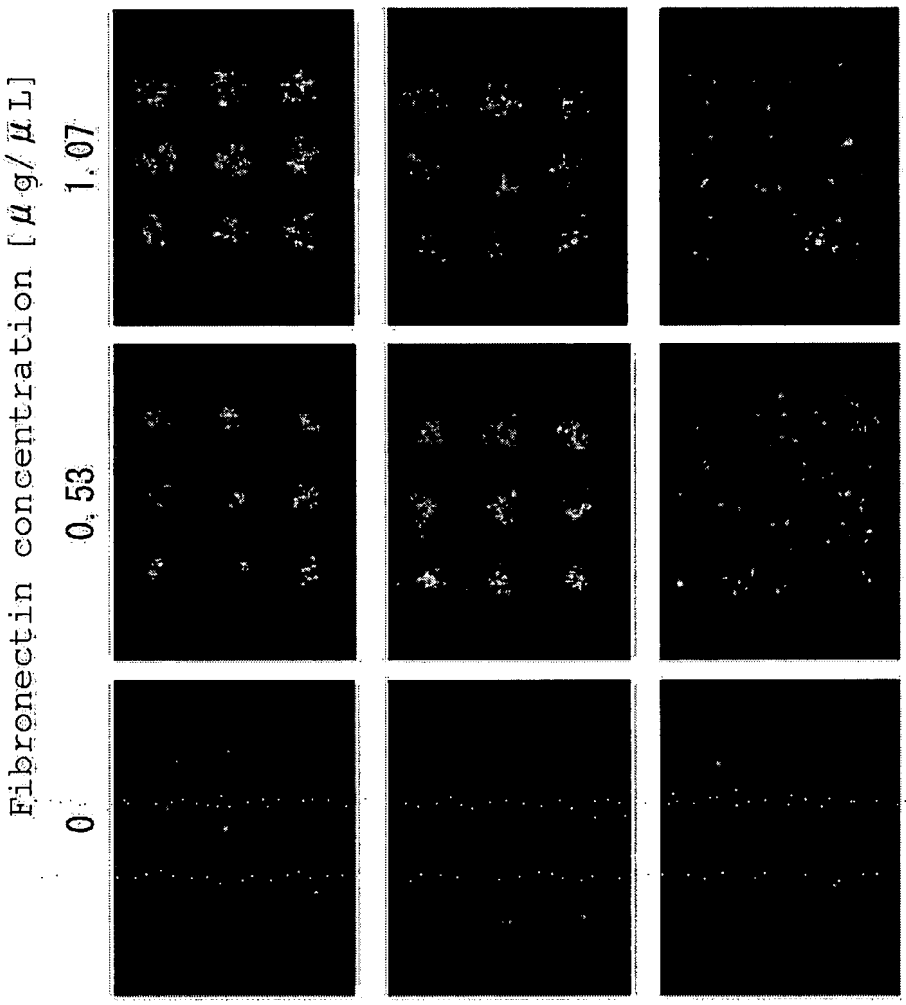

Fibronectin concentration [μg/μL]
0
0.53
1.07
APS
PLL
No coating

Fig. 7

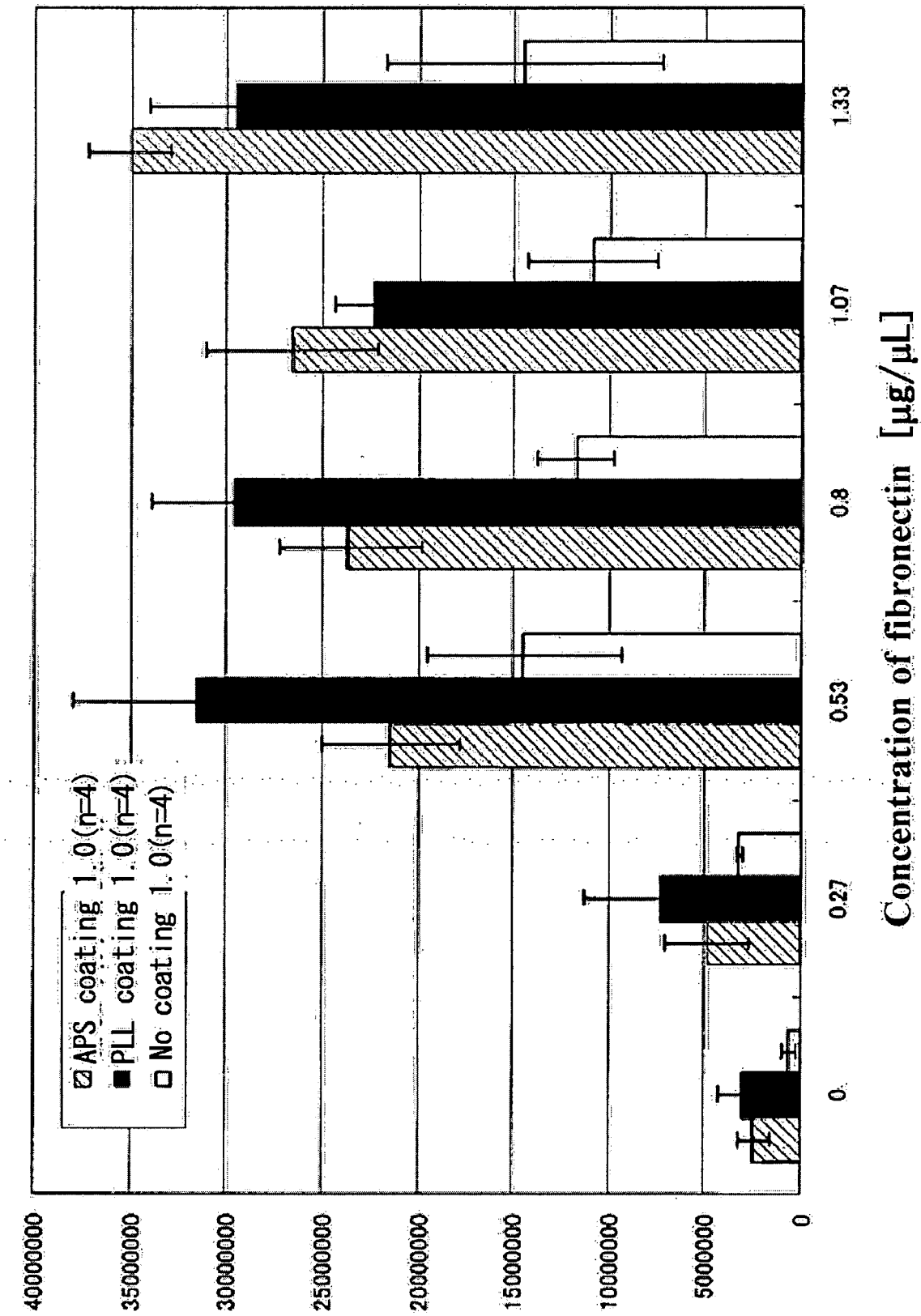
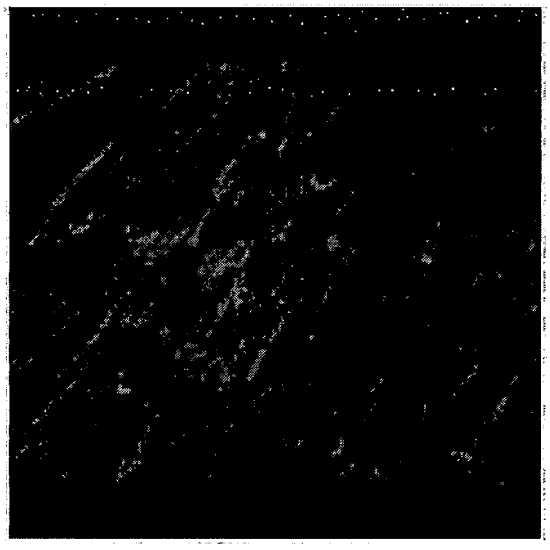
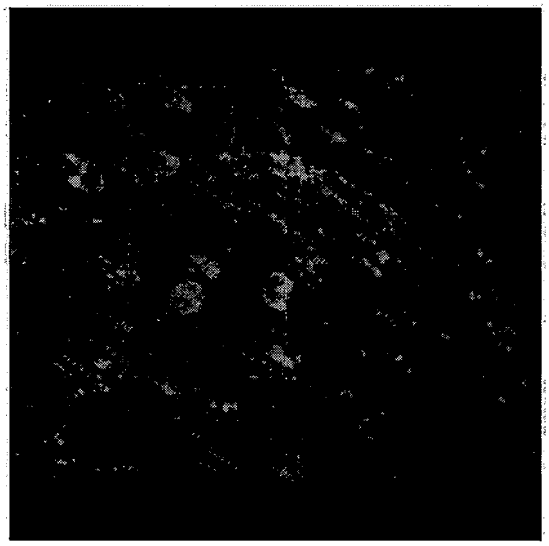

APS coating 1.0(n=4)
PLL coating 1.0(n=4)
No coating 1.0(n=4)
40000000
35000000
30000000
25000000
20000000
15000000
10000000
5000000
0
0
0.27
0.53
0.8
1.07
1.33
Concentration of fibronectin [μg/μL]

FIG.8

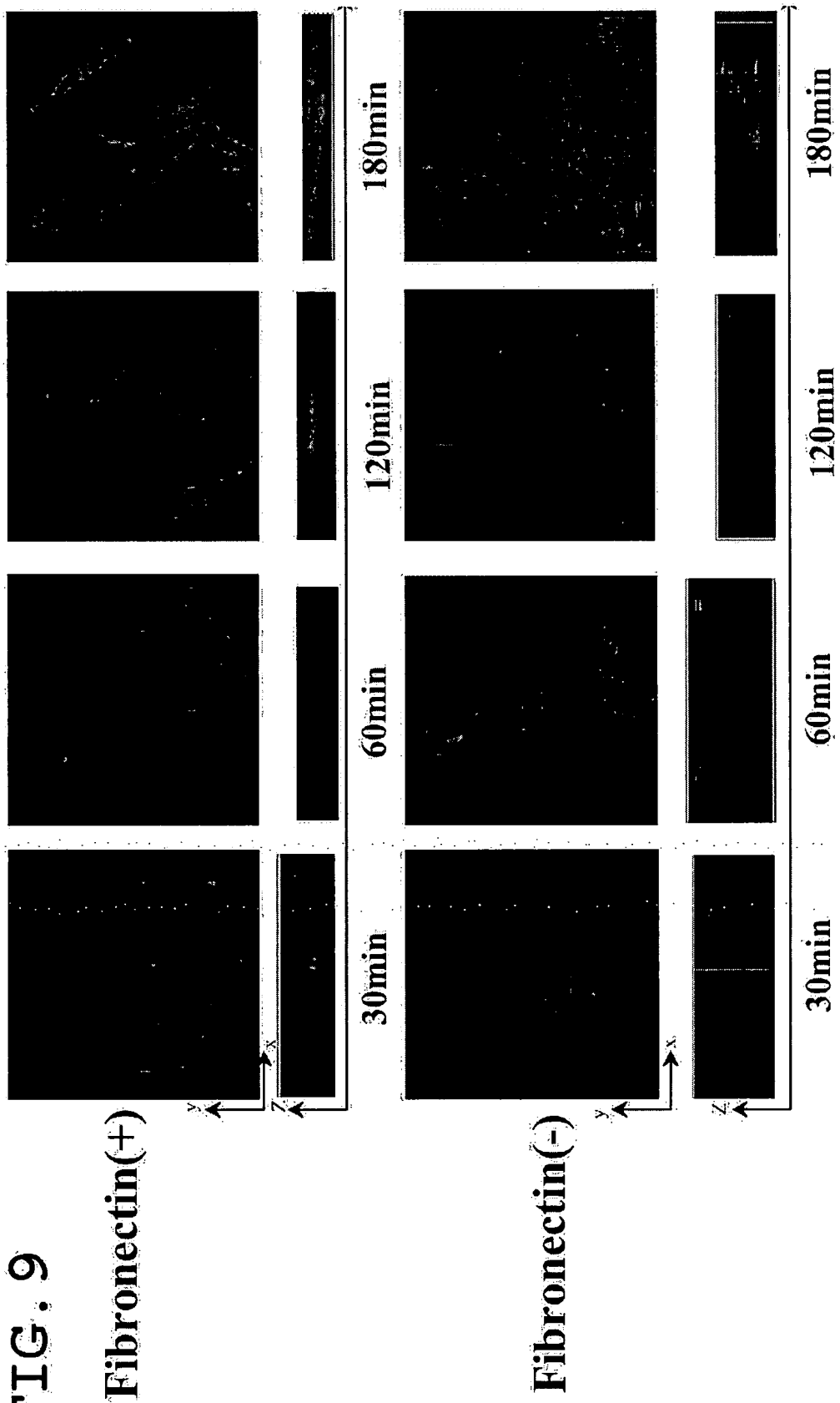


Fibronectin(+)



Fibronectin(-)

FIG. 9


Fibronectin(+)
Fibronectin(-)
30min
60min
120min
180min
30min
60min
120min
180min

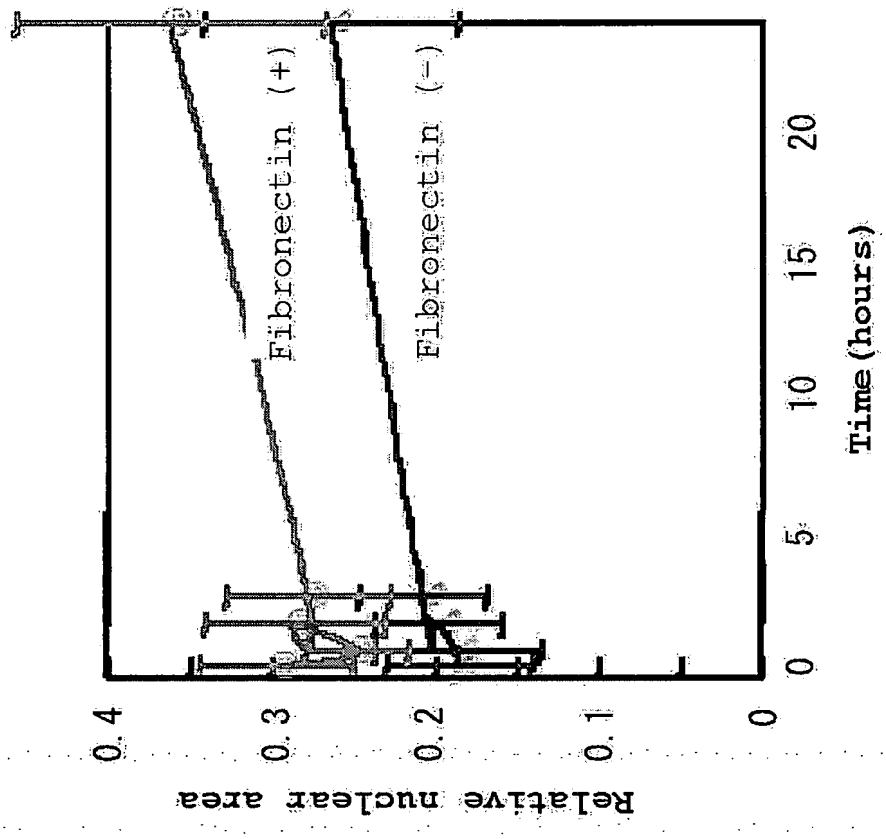

Fibronectin (+)
Fibronectin (−)
Relative nuclear area
0.4
0.3
0.2
0.1
0
0
5
10
15
20
Time (hours)

FIG. 10

FIG. 11

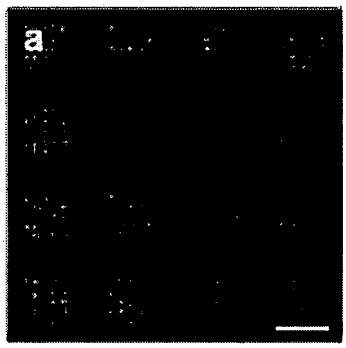


FIG. 12

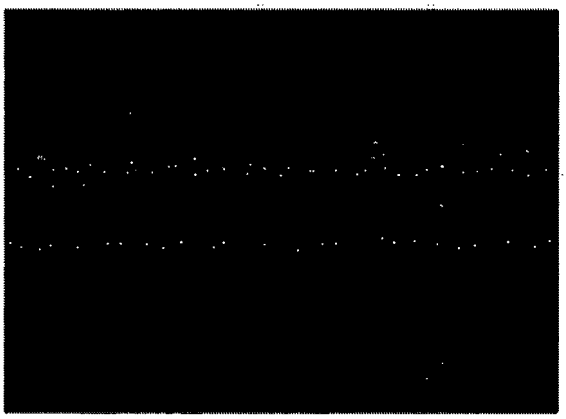


FIG. 13

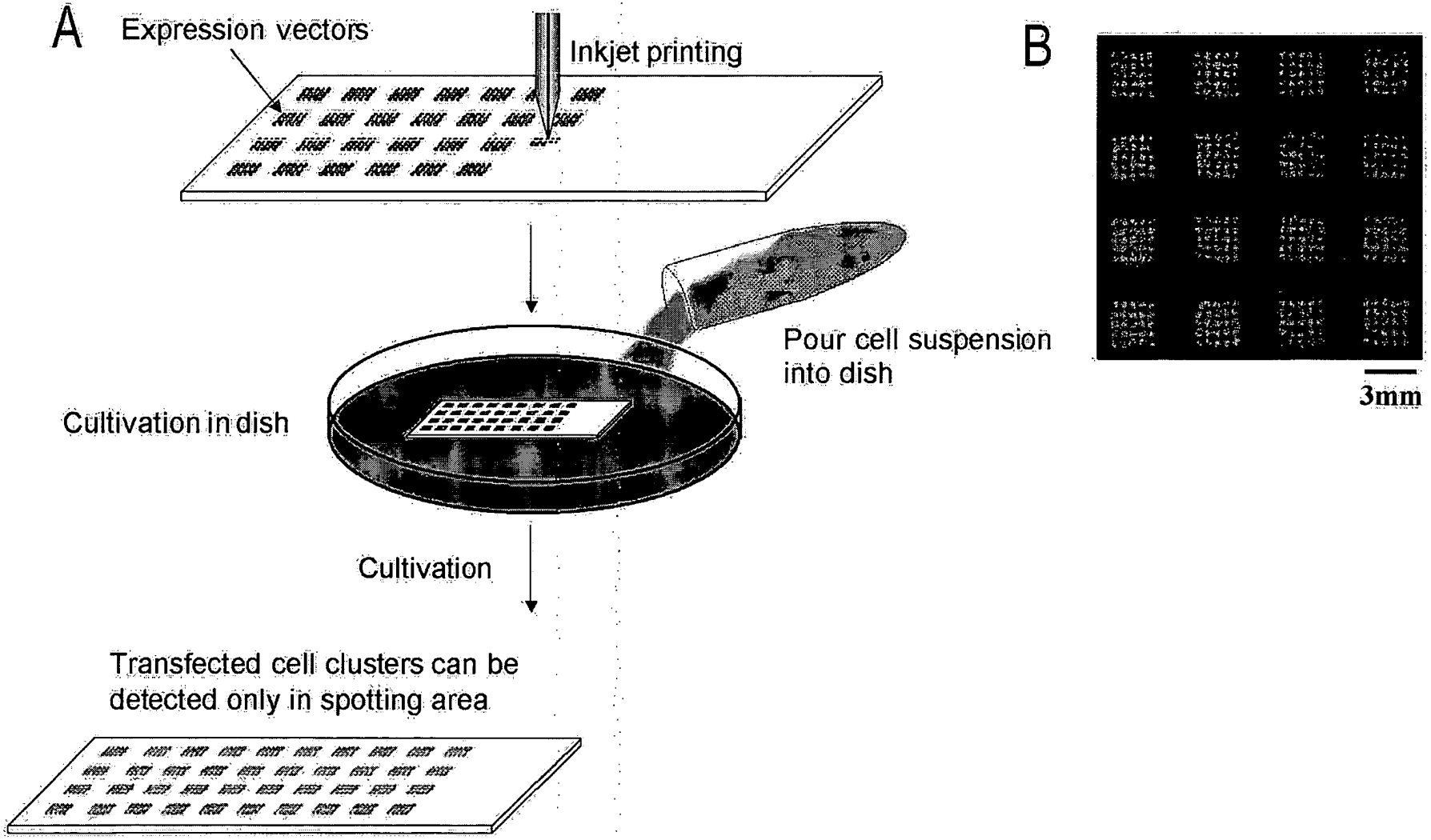

A
Expression vectors
Inkjet printing
Pour cell suspension into dish
Cultivation in dish
Cultivation
Transfected cell clusters can be detected only in spotting area
B
3mm

FIG.13C

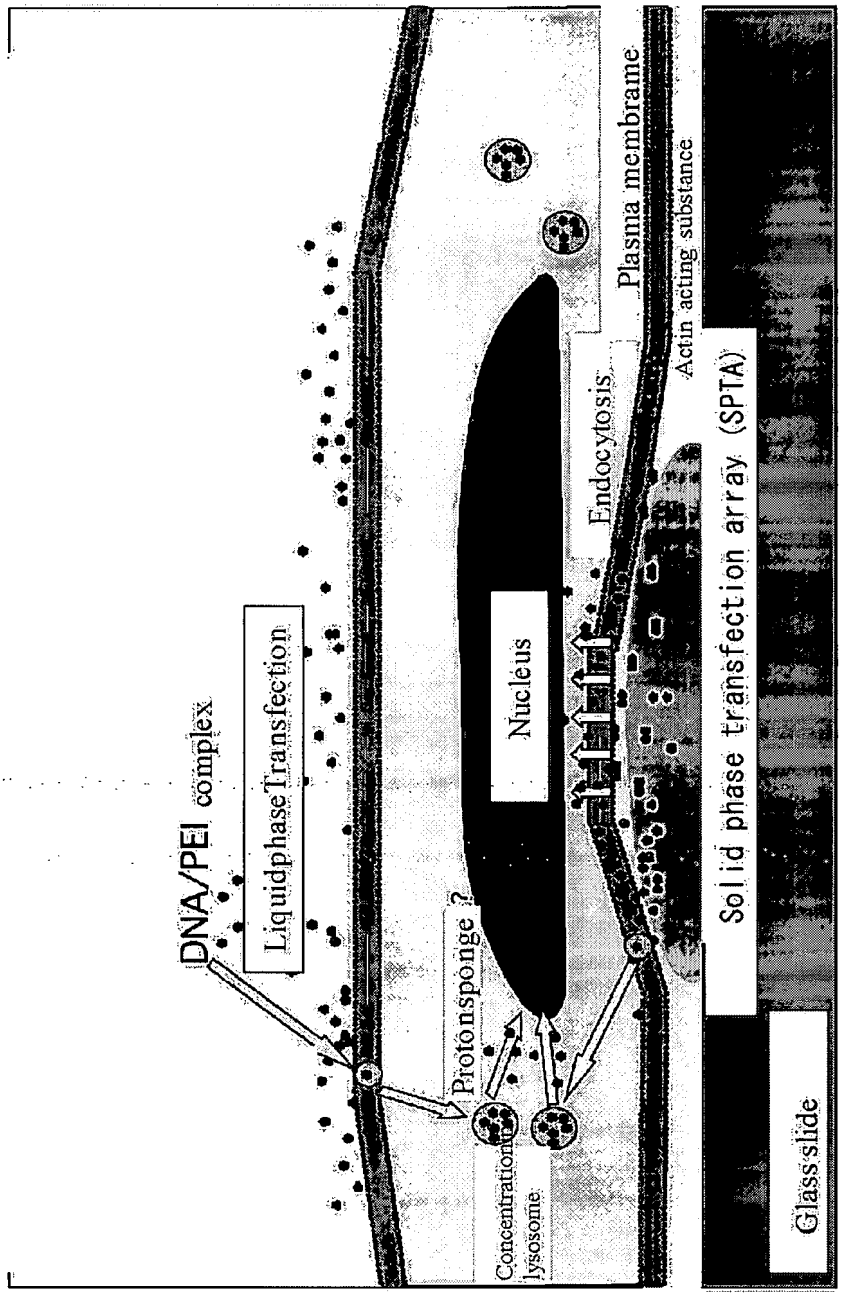
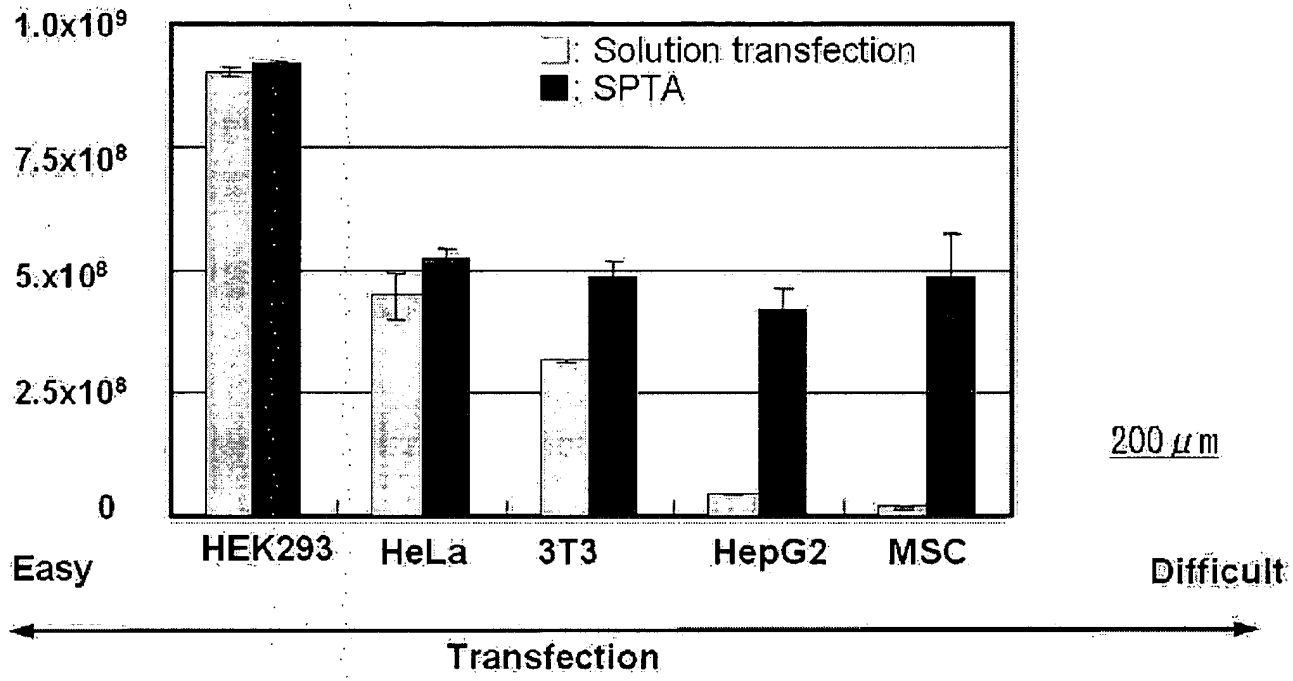

DNA/PEI complex
Liquidphase Transfection
Protonsponge ?
Concentration
lysosome
Nucleus
Endocytosis
Plasma membrame
Actin acting substance
Solid phase transfection array (SPTA)
Glass slide

FIG. 14


A
1.0x10⁹
7.5x10⁸
5.x10⁸
2.5x10⁸
0
□: Solution transfection
■: SPTA
200 μm
HEK293
HeLa
3T3
HepG2
MSC
Easy
Difficult
Transfection

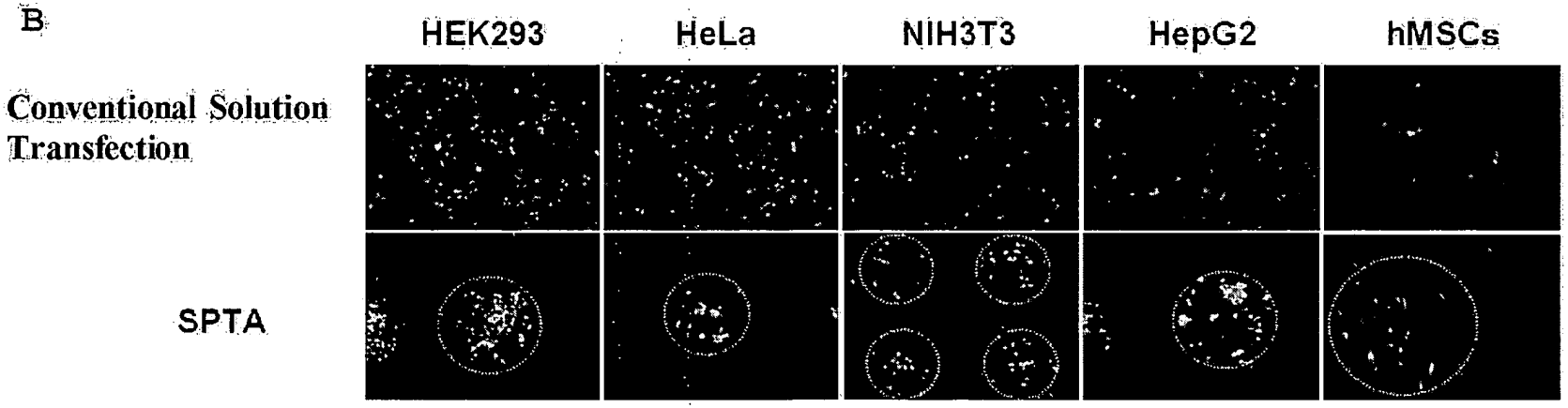

B
HEK293
HeLa
NIH3T3
HepG2
hMSCs
Conventional Solution Transfection
SPTA

FIG. 14C

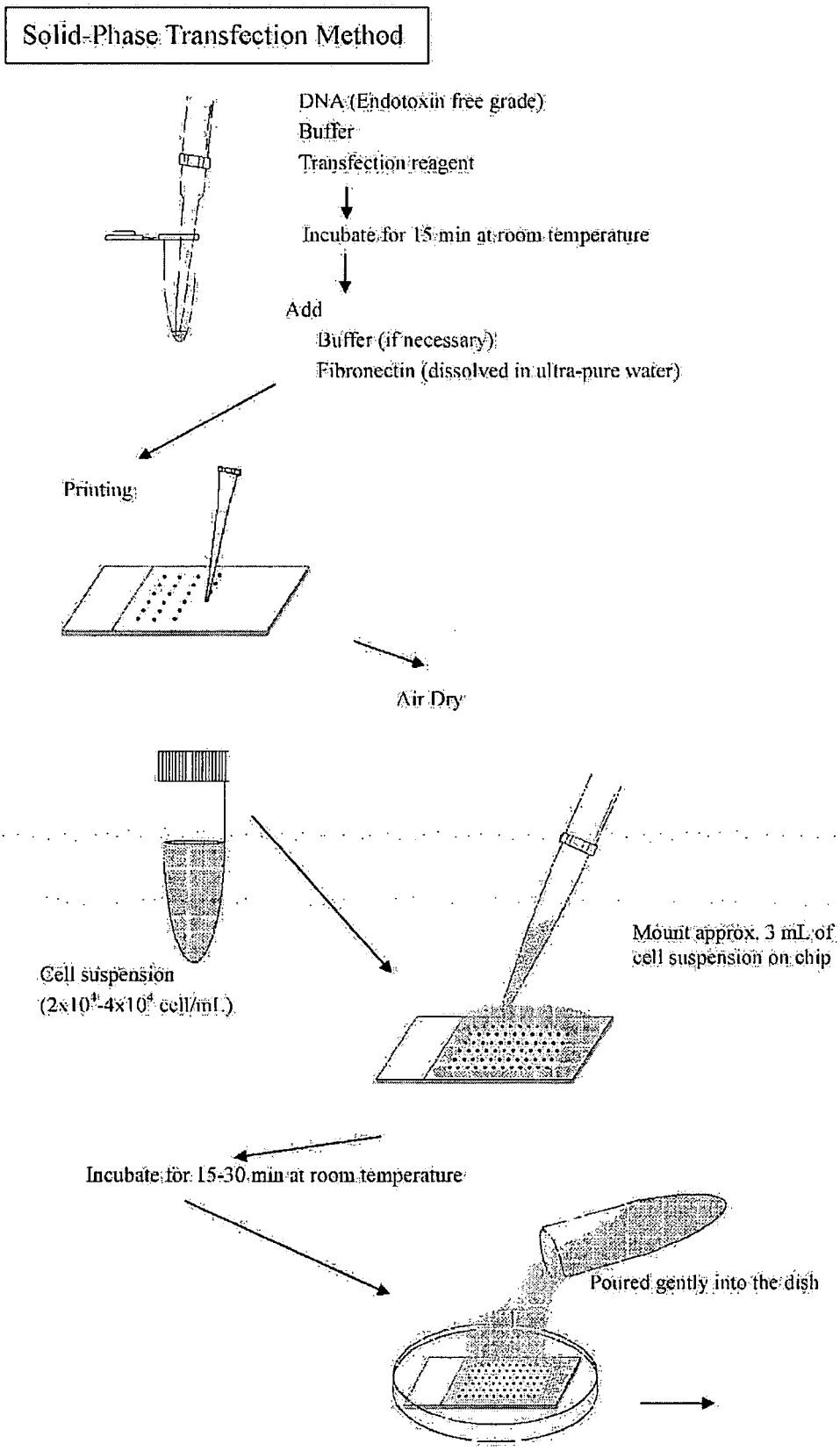

Solid-Phase Transfection Method
DNA (Endotoxin free grade)
Buffer
Transfection reagent
Incubate for 15 min at room temperature
Add
Buffer (if necessary)
Fibronectin (dissolved in ultra-pure water)
Printing
Air Dry
Cell suspension
(2x10⁴-4x10⁴ cell/mL)
Mount approx. 3 mL of cell suspension on chip
Incubate for 15-30 min at room temperature
Poured gently into the dish

FIG. 14D

For HEK293

DMEM (serum free)	9.5	uL
Plasmid DNA (1mg/mL)	1.5	uL
TransFast (1mg/mL)	9.0	uL
DMEM (serum free)	5.0	uL
Fibronectin (4mg/mL)	5.0	uL
Final volume	30.0	uL

Scheme for HEK293

1.5mL micro-tube
↓ ←DMEM
↓ ←Plasmid DNA
mix
↓ ←TransFast
Incubate for 2-3 days at 37℃ in 5% CO_2
mix completely and incubate for 15 min at RT
↓ ←DMEM
↓ ←Fibronectin
mix completely
↓
ready to print

For HeLa, NIH3T3-3, HepG2

DMEM (serum free)	14.5	uL
Plasmid DNA (1mg/mL)	1.5	uL
Lipofectamine2000	4.5	uL
DMEM (serum free)	5.0	uL
Fibronectin (4mg/mL)	5.0	uL
Final volume	30.0	uL

Scheme for HeLa, NIH3T3-3, and HepG2

1.5mL micro-tube
↓ ←DMEM
↓ ←Plasmid DNA
mix
↓ ←Lipofectamine2000
mix completely and incubate for 15 min at RT
↓ ←DMEM
↓ ←Fibronectin
mix completely
↓
ready to print

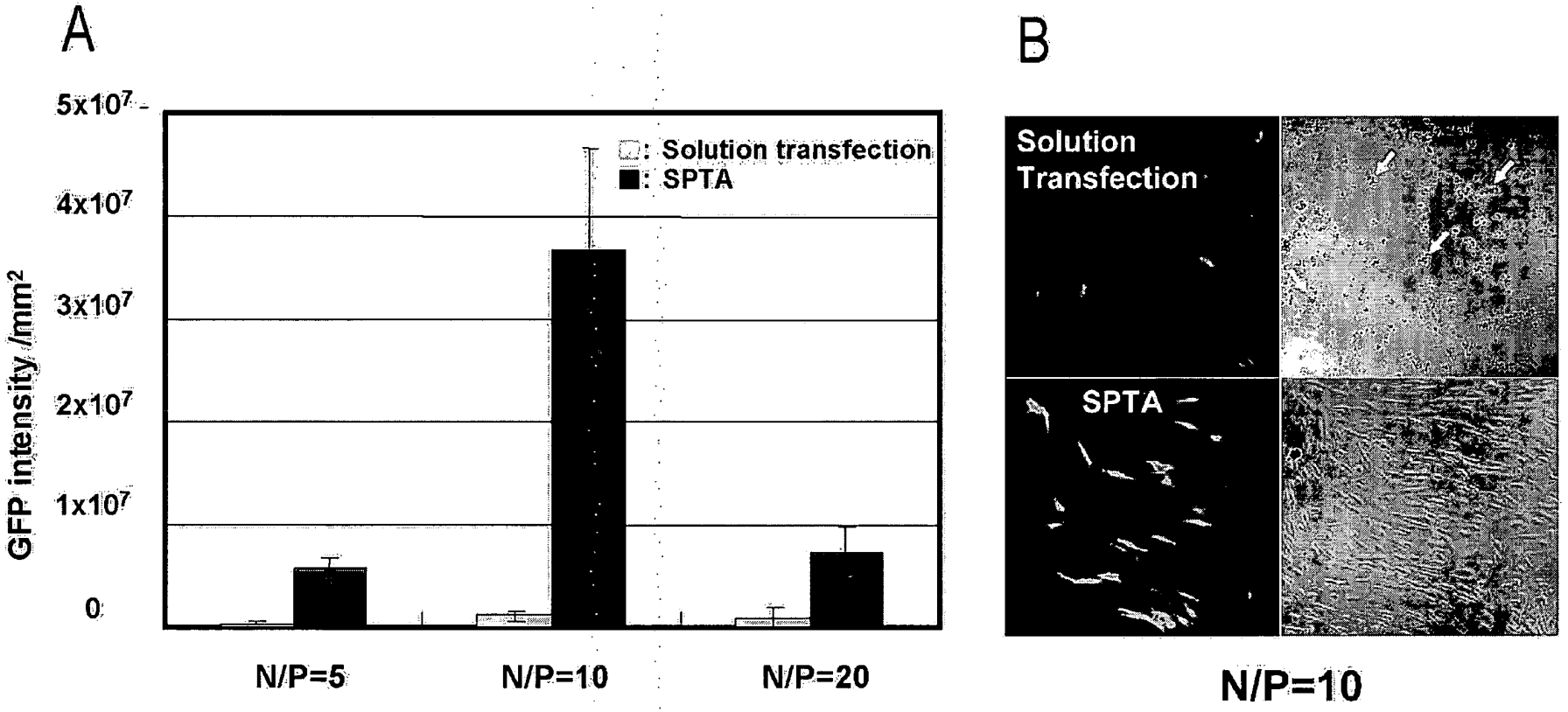
For hMSCs

	N/P=5	N/P=10	N/P=20	
DMEM (serum free)	12.75	12.0	10.5	uL
Plasmid DNA (1mg/mL)	1.5	1.5	1.5	uL
JetPEI (x4) conc.	0.75	1.5	3.0	uL
Fibronectin (4mg/mL)	5.0	5.0	5.0	uL
Final volume	20.0	20.0	20.0	uL

Scheme for hMSCs

1.5mL micro-tube
↓ ←DMEM
↓ ←Plasmid DNA
mix
↓ ←jetPEI
mix completely and incubate for 15 min at RT
↓ ←Fibronectin
mix completely
↓
ready to print

FIG. 15


A
5x10^7
4x10^7
3x10^7
2x10^7
1x10^7
0
GFP intensity /mm^2
: Solution transfection
: SPTA
N/P=5
N/P=10
N/P=20
B
Solution Transfection
SPTA
N/P=10

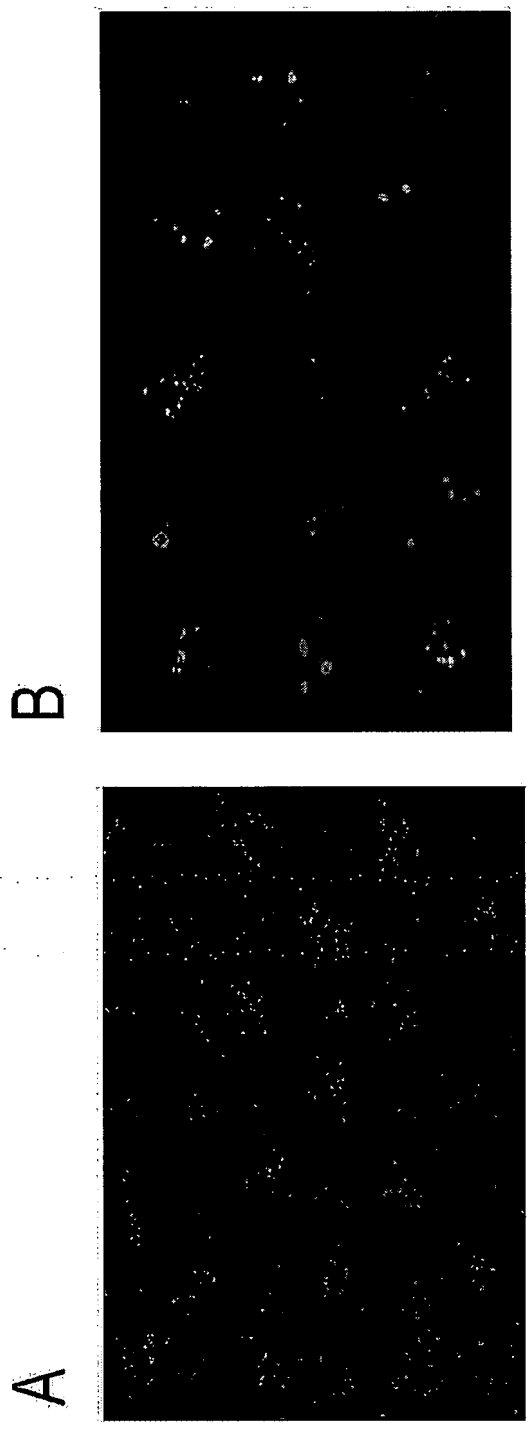


FIG.16

FIG.16C

Number of adherent cells

	Time(min)					
	0	5	10	15	20	30
APS	235	220	202	157	170	162
APS+gelatin	212	206	184	145	156	183
APS+fibronectin	229	198	183	132	100	85
APS+pronectin L	257	170	126	94	71	47
PLL	231	221	205	162	168	159
PLL+gelatin	218	208	186	151	146	156
PLL+fibronectin	225	174	162	129	98	79
PLL+pronectin L	214	151	132	90	76	50
MAS	231	222	216	182	176	169
MAS+gelatin	224	198	182	163	159	162
MAS+fibronectin	218	182	169	143	112	86
MAS+pronectin L	220	176	152	124	101	66
No coating	226	216	208	192	183	164

Cell adhension rate (proportion of adherent cells (%))

	Time(min)					
	0	5	10	15	20	30
APS	0	6.382979	14.04255	33.19149	27.65957	31.06383
APS+gelatin	0	2.830189	13.20755	31.60377	26.41509	13.67925
APS+fibronectin	0	13.53712	20.08734	42.35808	56.33188	62.8821
APS+pronectin L	0	33.85214	50.97276	63.42412	72.37354	81.71206
PLL	0	4.329004	11.25541	29.87013	27.27273	31.16883
PLL+gelatin	0	4.587156	14.6789	30.73394	33.02752	28.44037
PLL+fibronectin	0	22.66667	28	42.66667	56.44444	64.88889
PLL+pronectin L	0	29.43925	38.31776	57.94393	64.48598	76.63551
MAS	0	3.896104	6.493506	21.21212	23.80952	26.83983
MAS+gelatin	0	11.60714	18.75	27.23214	29.01786	27.67857
MAS+fibronectin	0	16.51376	22.47706	34.40367	48.62385	60.55046
MAS+pronectin L	0	20	30.90909	43.63636	54.09091	70
No coating	0	4.424779	7.964602	15.04425	19.02655	27.43363

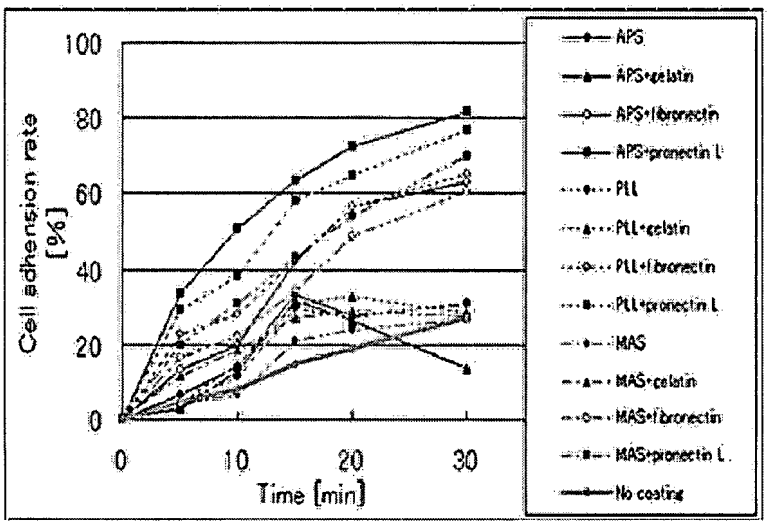
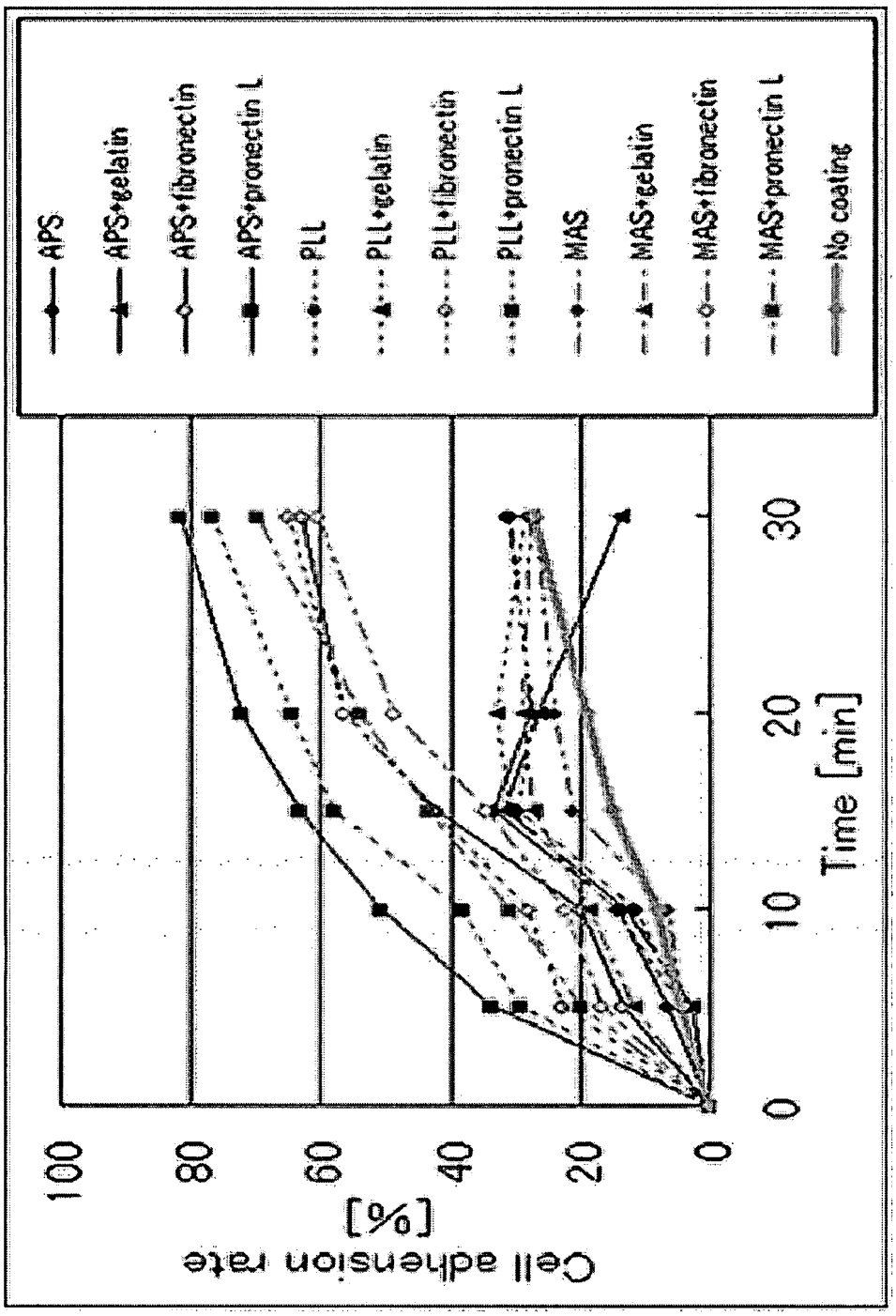


FIG.16D


Cell adhension rate
[%]
100
80
60
40
20
0
0
10
20
30
Time [min]
APS
APS+gelatin
APS+fibronectin
APS+pronectin L
PLL
PLL+gelatin
PLL+fibronectin
PLL+pronectin L
MAS
MAS+gelatin
MAS+fibronectin
MAS+pronectin L
No coating

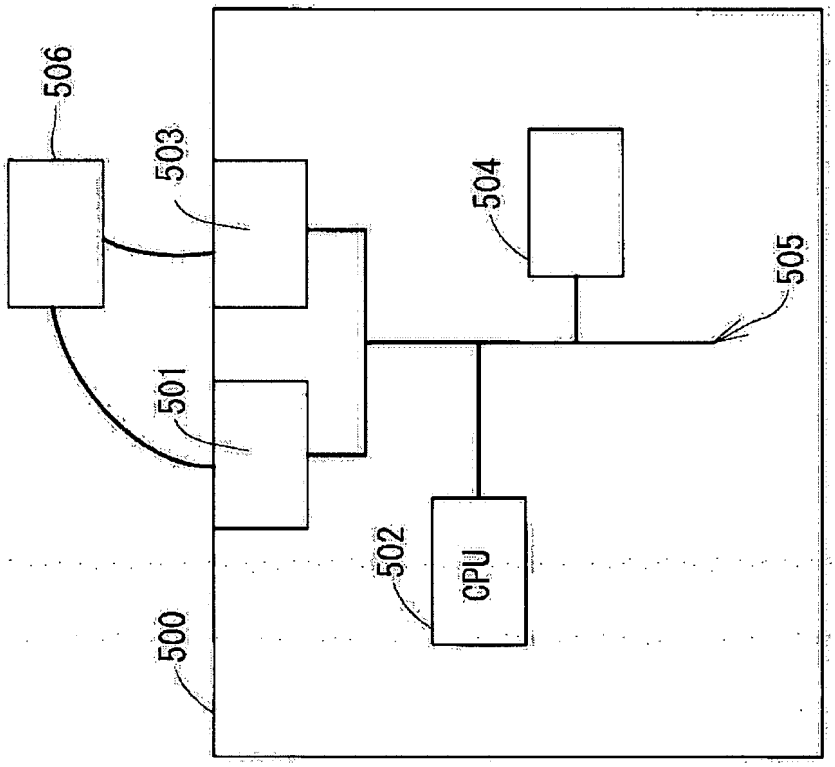
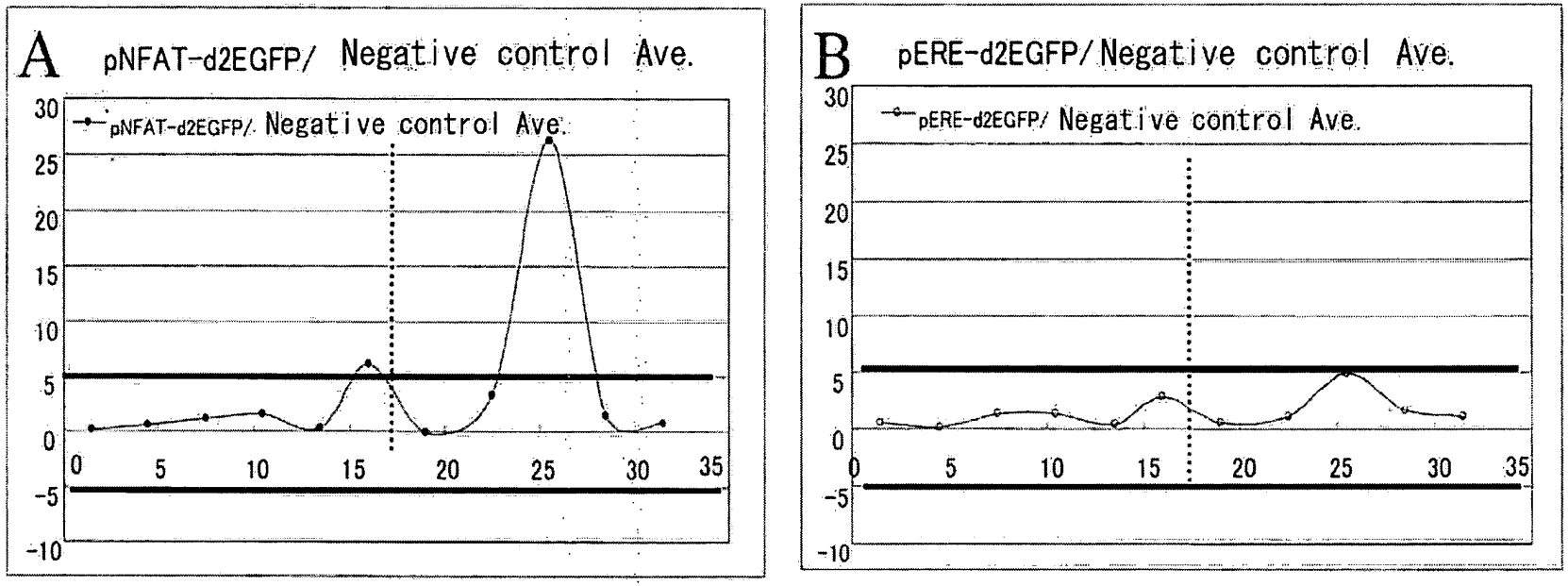


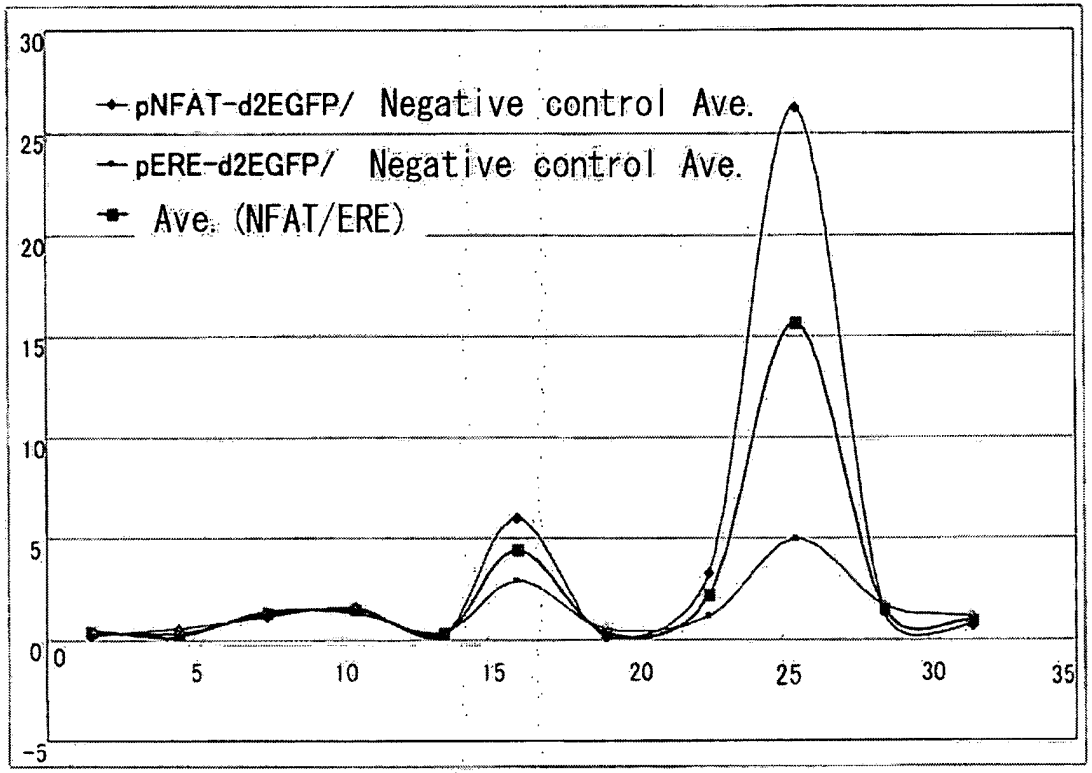
FIG. 17

FIG. 18A



	0-31.5 hr	17.5-31.5 hr	0-17.5 hr
A	+	+	+
B	+	+	-

FIG.18B



	0-31.5 hr	17.5-31.5 hr	0-17.5 hr
NFAT	+	+	+
ERE	+	-	-
NFAT/ERE	+	+	-

FIG. 19

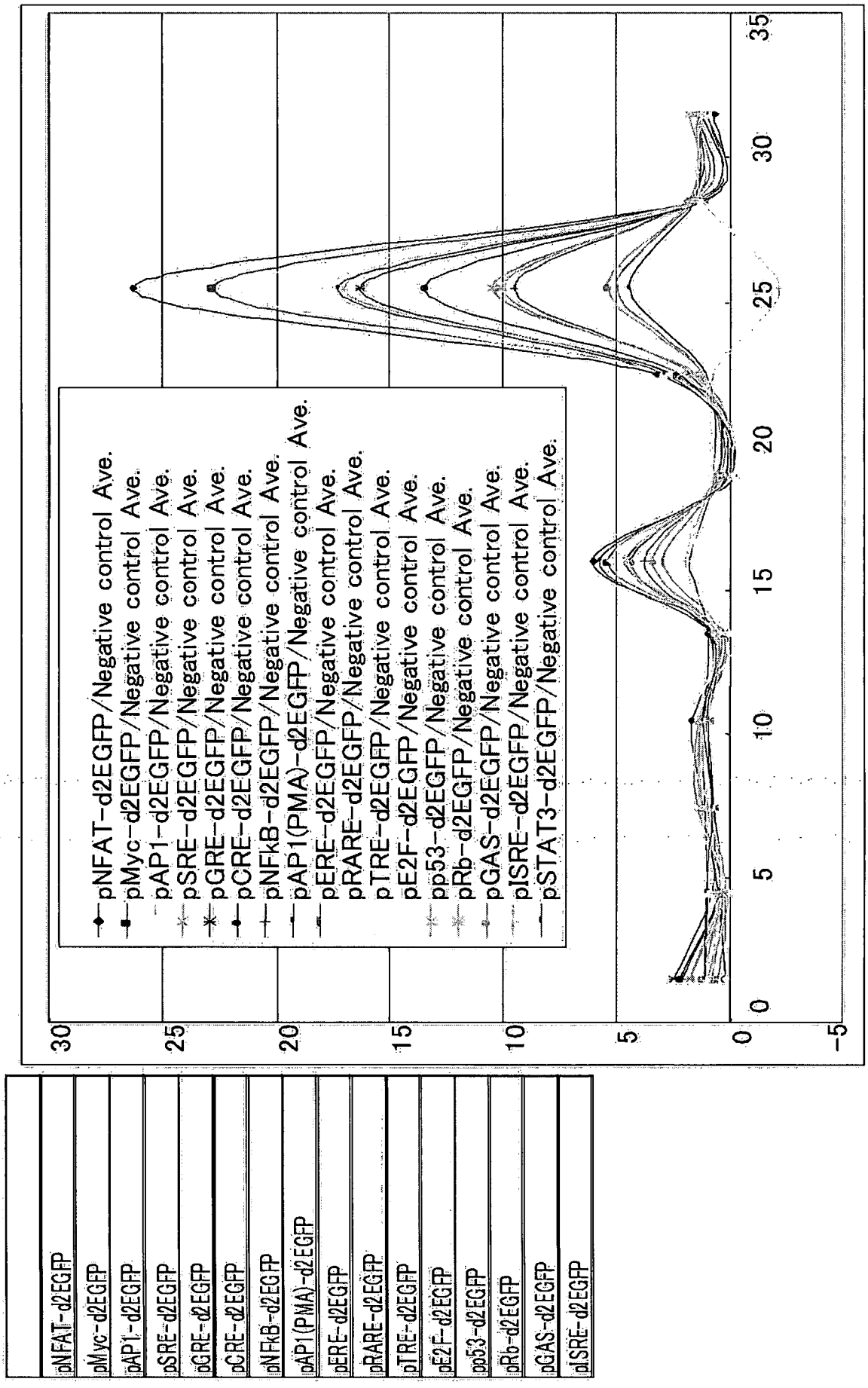

pNFAT-d2EGFP
pMyc-d2EGFP
pAP1-d2EGFP
pSRE-d2EGFP
pGRE-d2EGFP
pCRE-d2EGFP
pNFkB-d2EGFP
pAP1(PMA)-d2EGFP
pERE-d2EGFP
pRARE-d2EGFP
pTRE-d2EGFP
pE2F-d2EGFP
pp53-d2EGFP
pRb-d2EGFP
pGAS-d2EGFP
pISRE-d2EGFP
pSTAT3-d2EGFP
pNFAT-d2EGFP/Negative control Ave.
pMyc-d2EGFP/Negative control Ave.
pAP1-d2EGFP/Negative control Ave.
pSRE-d2EGFP/Negative control Ave.
pGRE-d2EGFP/Negative control Ave.
pCRE-d2EGFP/Negative control Ave.
pNFkB-d2EGFP/Negative control Ave.
pAP1(PMA)-d2EGFP/Negative control Ave.
pERE-d2EGFP/Negative control Ave.
pRARE-d2EGFP/Negative control Ave.
pTRE-d2EGFP/Negative control Ave.
pE2F-d2EGFP/Negative control Ave.
pp53-d2EGFP/Negative control Ave.
pRb-d2EGFP/Negative control Ave.
pGAS-d2EGFP/Negative control Ave.
pISRE-d2EGFP/Negative control Ave.
pSTAT3-d2EGFP/Negative control Ave.
30
25
20
15
10
5
0
-5
0
5
10
15
20
25
30
35

FIG.20

TH=5	Day0-1			
	Induction of differentiation	0-31.5	0-17.5	17.5-31.5
	Extraction number=1	82.35294	29.41176	82.35294
	Extraction number=2	70.58824	41.17647	88.23529
	Extraction number=3	88.23529	29.41176	94.11765
	Extraction number=5	94.11765	11.76471	94.11765
	Extraction number=8	100	5.882353	100
	Extraction number=16	100	0	100
	Extraction number=17	100	0	100

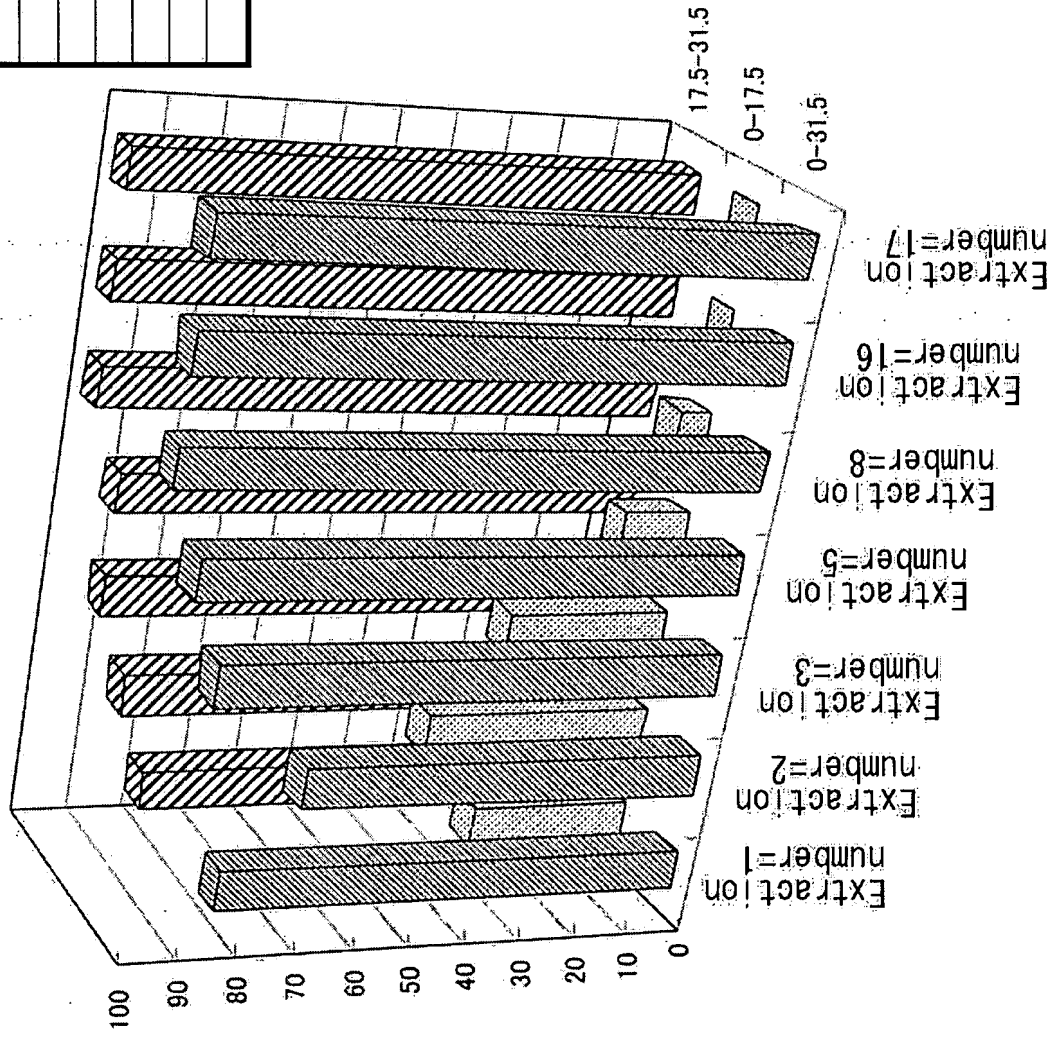


FIG.21

No induction of differentiation	0-31.5	0-17.5	17.5-31.5
Extraction number=1	5.882353	5.882353	0
Extraction number=2	0	0	0
Extraction number=3	0	0	0
Extraction number=5	0	0	0
Extraction number=8	0	0	0
Extraction number=16	0	0	0
Extraction number=17	0	0	0

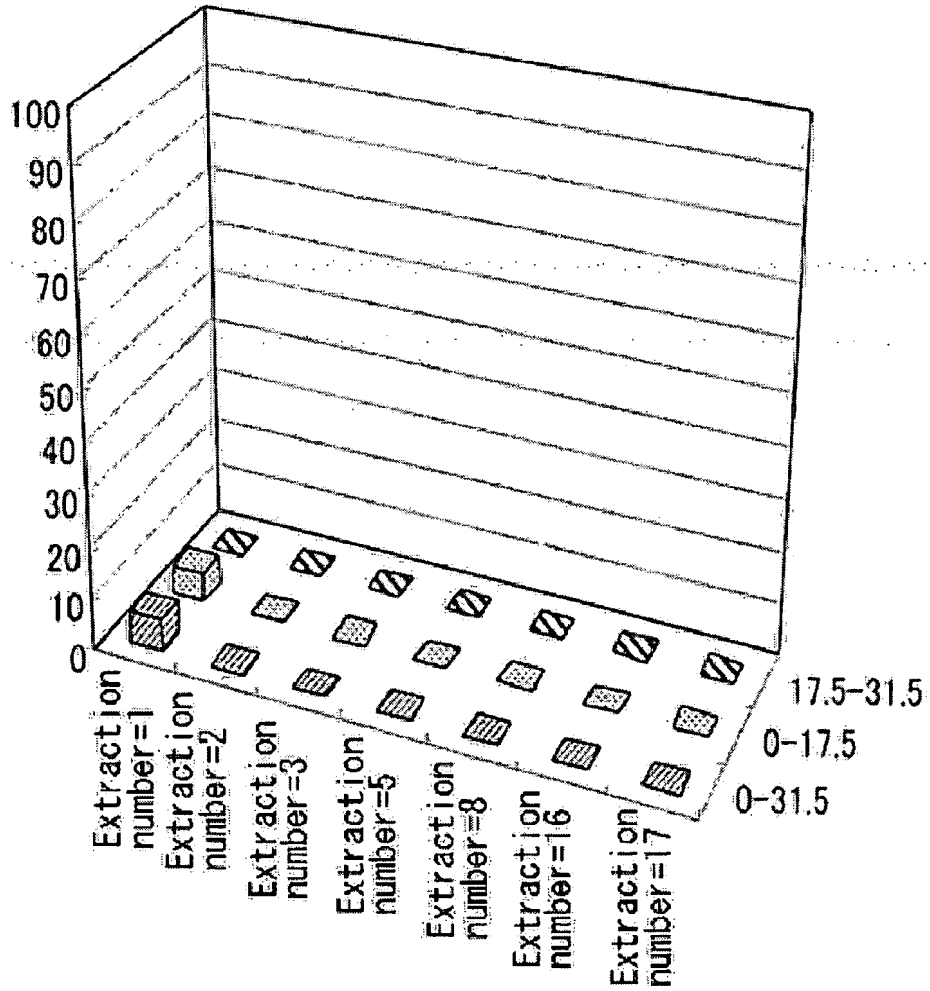


FIG. 22

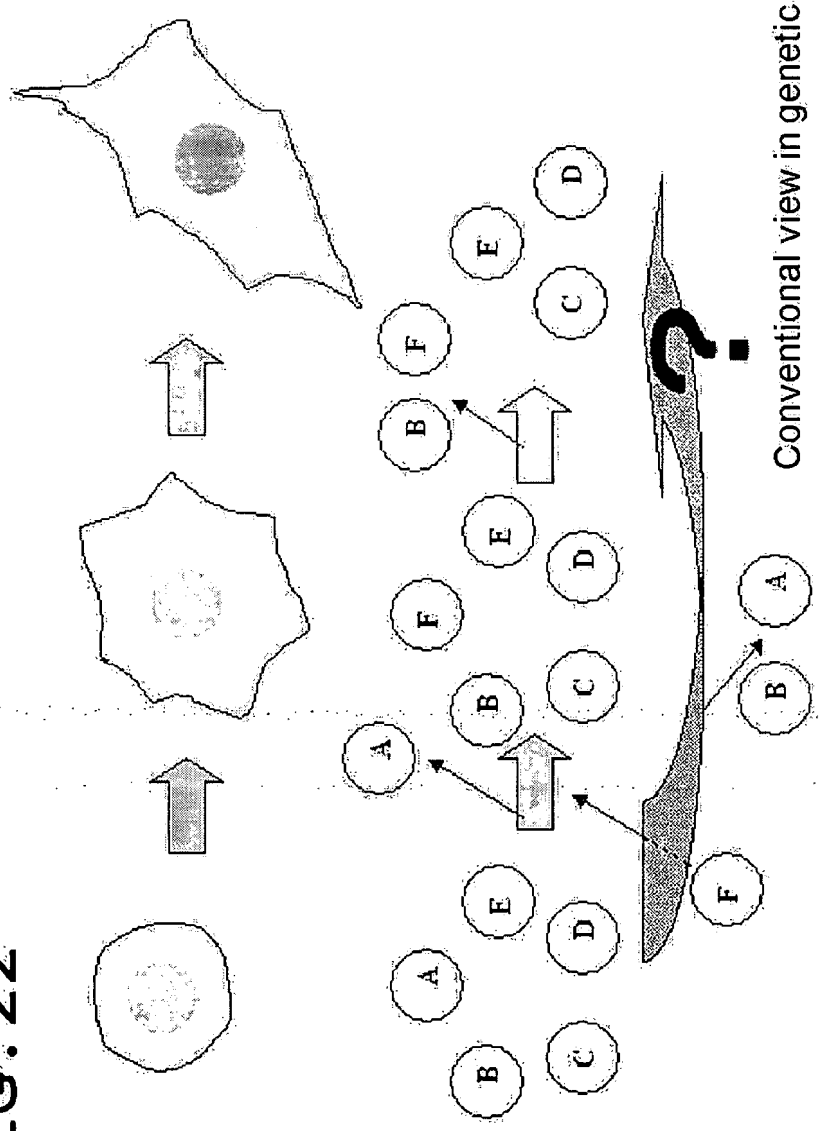


FIG.23

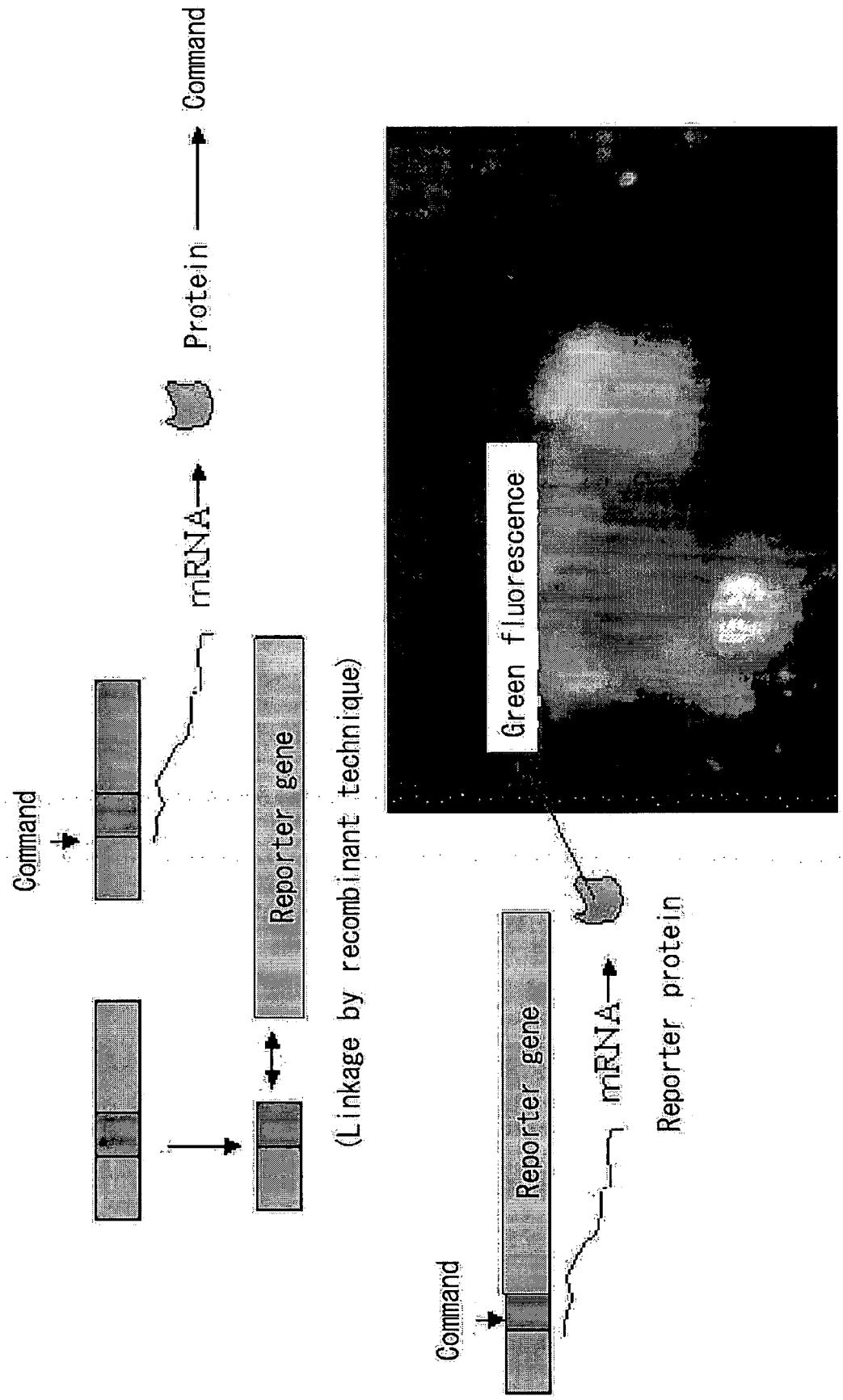
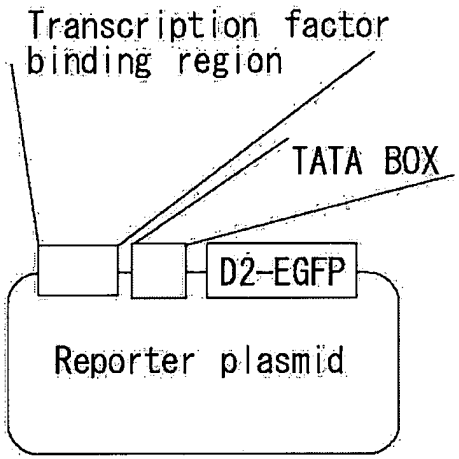
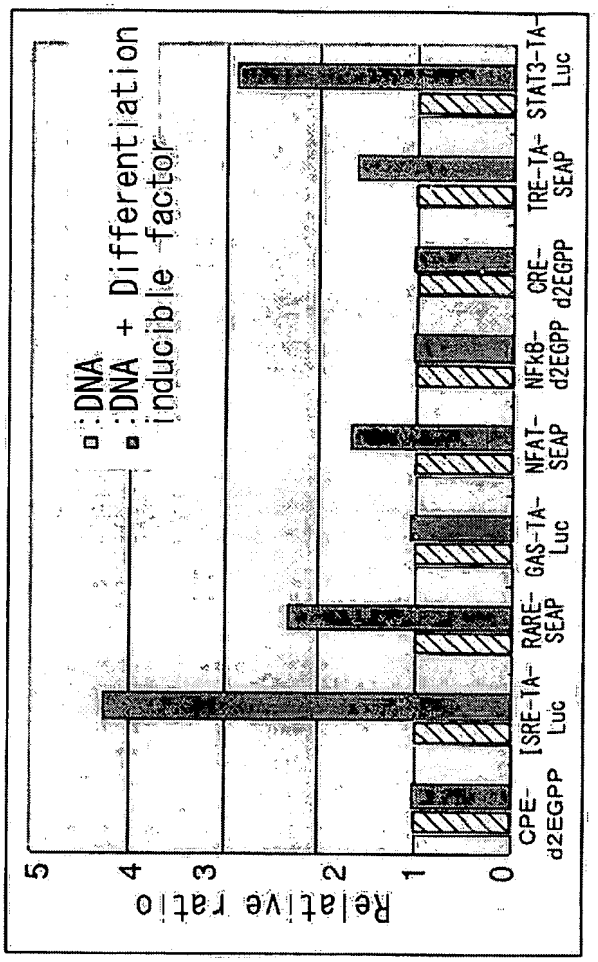

Command
mRNA
Protein
Command
Reporter gene
(Linkage by recombinant technique)
Green fluorescence
Command
Reporter gene
mRNA
Reporter protein

FIG. 24 Construction of transcription factor reporter



Vector	Pathway	Transcription factor	Cis-acting enhancer element
pNFkB-d2FGFP	IKK/NFkB	NFkB	kB
pAP1-d2FGFP	SAPK/JNK	c—Jun, c-Fos	AP1
pSRF-d2FGFP	MAPK/JNK, MAPK/FRK	Flk-1,STAT, TCF,SRF	SRF
pGRF-d2FGFP	Glicocorticoide (HXP90 mediation)	GR	GRF
pCRF-d2FGFP	PKA/CRFB,JNK/p38 PKA	ATF2/CRFB	CRF
pMpc-TA-d2FGFP, pMYC-,d2FGFP	Cell cycle	c-myc	F-box
pHSF-d2FGFP	HSF	HSF	HSF
pNFAT-d2FGFP	NFAT/Calcineurin/PKC	NFAT	NFAT
pAP1(PMA)-TA-d2FGFP	PKC		AP1(PMA)
pRb-TA-d2FGFP	Cell cycle		Rb
pF2F-TA-d2FGFP	Cell cycle		F2F
pp53-TA-d2FGFP	Cell cycle apoptosis		P53
pGAN-TA-d2FGFP	JAK/STAT	STAT1/STAT1	GAS
pISRF-TA-d2FGFP	JAK/STAT	STAT2/STAT1	ISRF
pSTAT3-TA-d2FGFP	JAK/STAT	STAT3/STAT3	STAT3
pFRF-TA-d2FGFP	Estrogen receptor		FRF
pRARF-TA-d2FGFP	Retinoic acid		RARF
pTRF-TA-d2FGFP	Thyroid receptor		TRF

FIG. 25


□:DNA
■:DNA + Differentiation inducible factor
Relative ratio
0
1
2
3
4
5
CPE-d2EGPP
[SRE-TA-Luc
RARE-SEAP
GAS-TA-Luc
NFAT-SEAP
NFkB-d2EGPP
CRE-d2EGPP
TRE-TA-SEAP
STAT3-TA-Luc

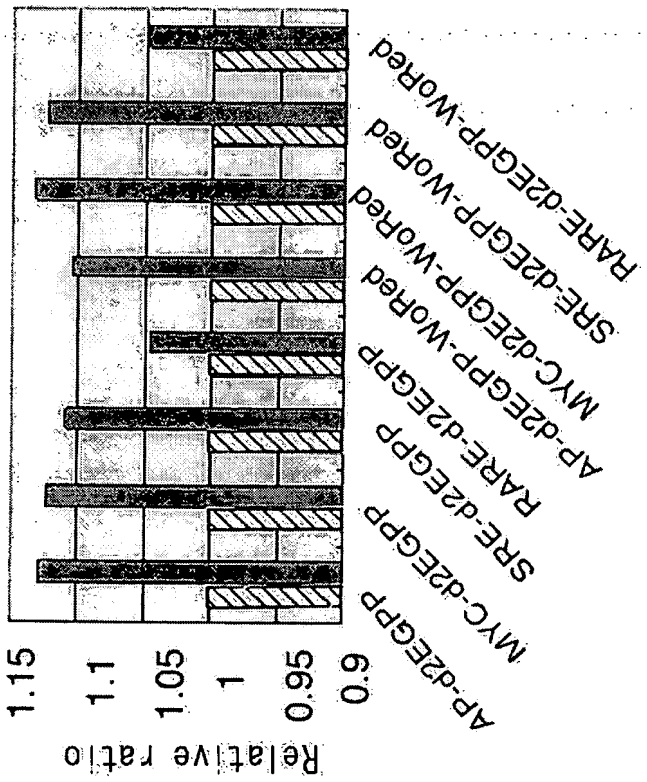

Relative ratio
0.9
0.95
1
1.05
1.1
1.15
AP-d2EGPP
MYC-d2EGPP
SRE-d2EGPP
RARE-d2EGPP
AP-d2EGPP-WoRed
MYC-d2EGPP-WoRed
SRE-d2EGPP-WoRed
RARE-d2EGPP-WoRed

FIG.26

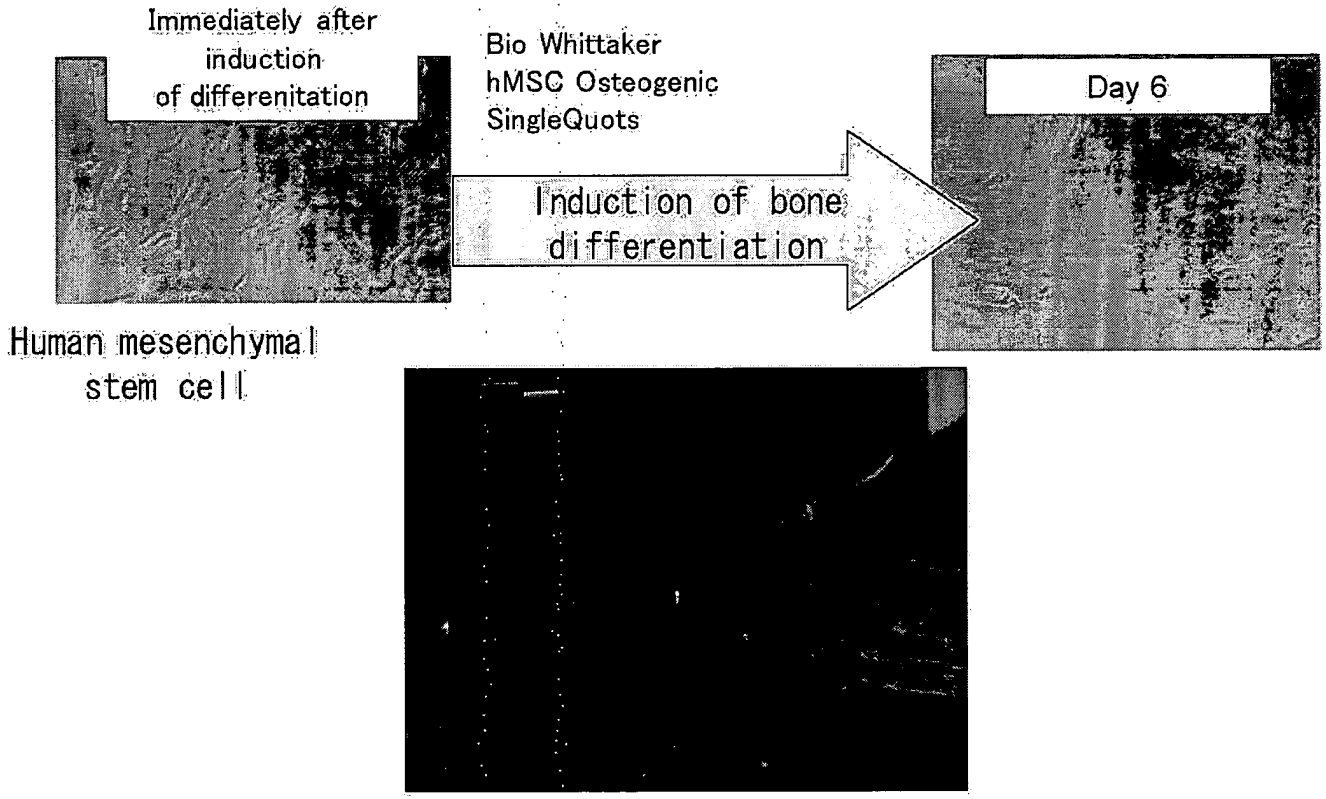
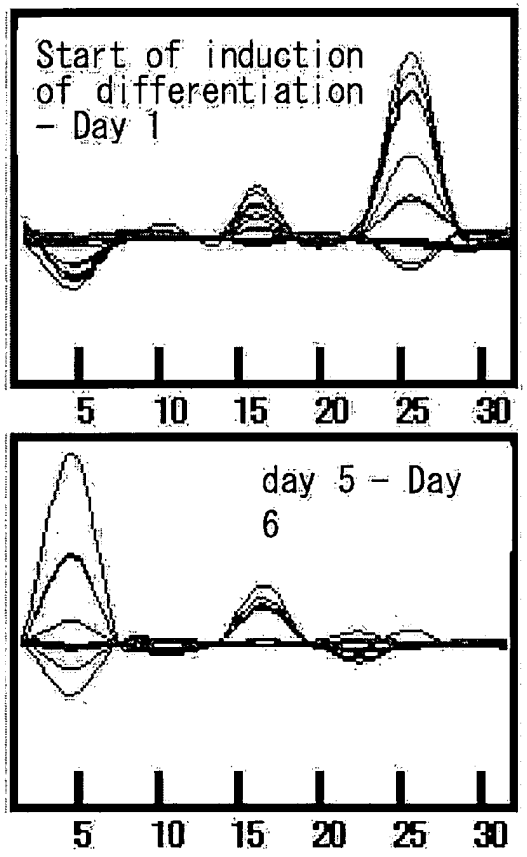

Immediately after induction of differenitation
Bio Whittaker hMSC Osteogenic SingleQuots
Induction of bone differentiation
Day 6
Human mesenchymal stem cell
TF array culturing chamber

FIG. 27

$$\frac{V_P - V_{Degfp}}{V_{PCMV} - V_{Degfp}}$$



— Differentiation induction conditions — Undifferentiated state conditions

Phases of transcription activity oscillation by induction of differentiation

Transcription factor	Undifferentiated state		Differentiated state			
ISRE	c	c	−	+	+	○ ← STAT1/STAT2
RARE	c	c	−	+	+	○ ← Retinoic acid
STAT3	c	c	+	−	+	○ ← Control of differentiation
GAS	c	c	+	+	+	
NFAT	c	c	+	+	+	
MIC	c	c	+	+	+	
AP1	c	c	+	+	+	
SRE	c	c	+	+	+	
GRE	c	c	+	−	+	○ ← Glucocorticoid
CRE	c	c	+	−	+	○ ← cAMP
NFAB	c	c	+	+	+	
ERE	c	c	+	+	+	
TRE	c	c	+	+	c	○ ← Thyroid hormone
E2F	c	c	+	c	+	○ ← Cell cycle
Rb	c	c	+	+	+	
P53	c	c	+	−	+	○ ← G1 check point

FIG. 28

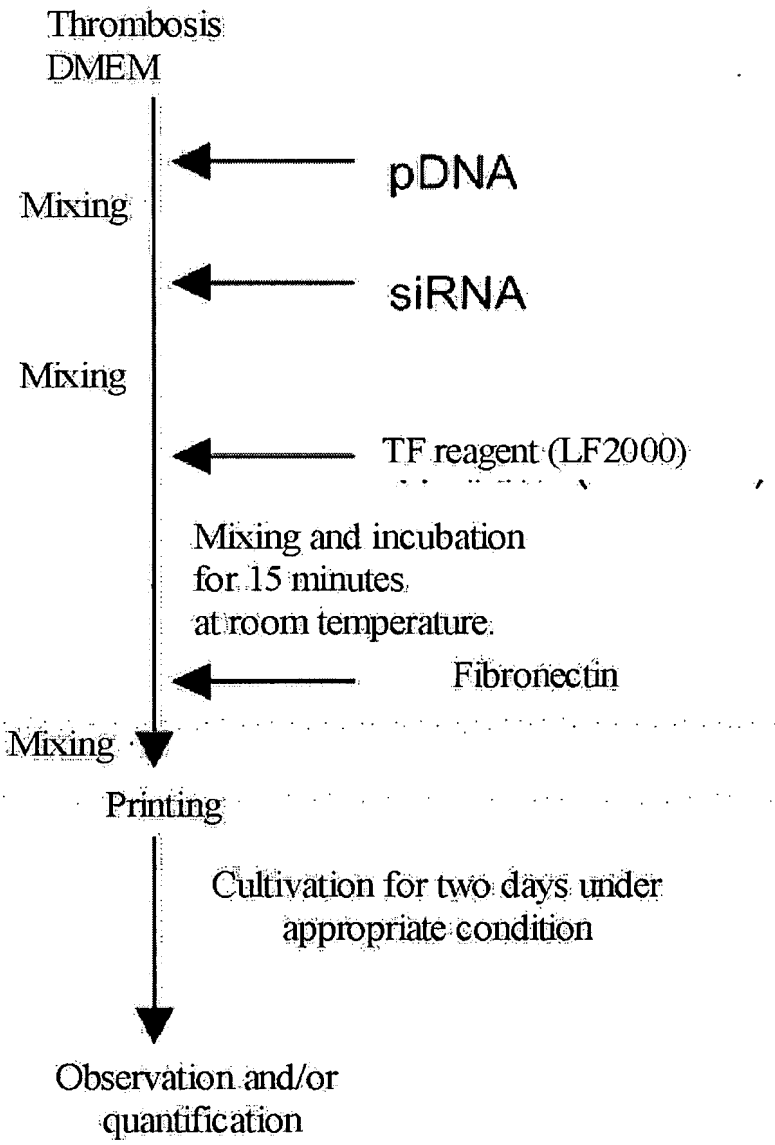

Thrombosis
DMEM
Mixing
pDNA
siRNA
Mixing
TF reagent (LF2000)
Mixing and incubation
for 15 minutes
at room temperature
Fibronectin
Mixing
Printing
Cultivation for two days under
appropriate condition
Observation and/or
quantification

Fig. 29

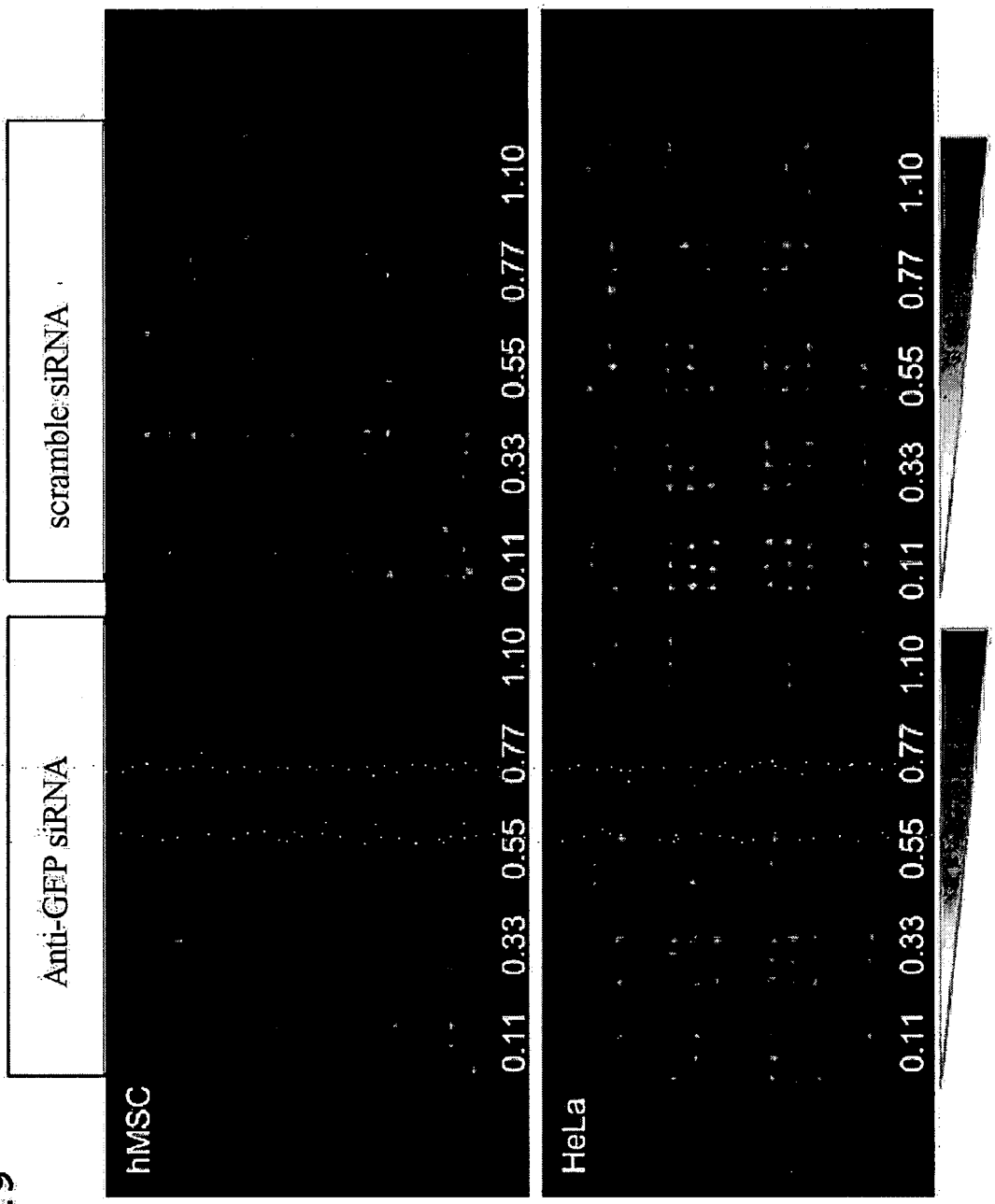
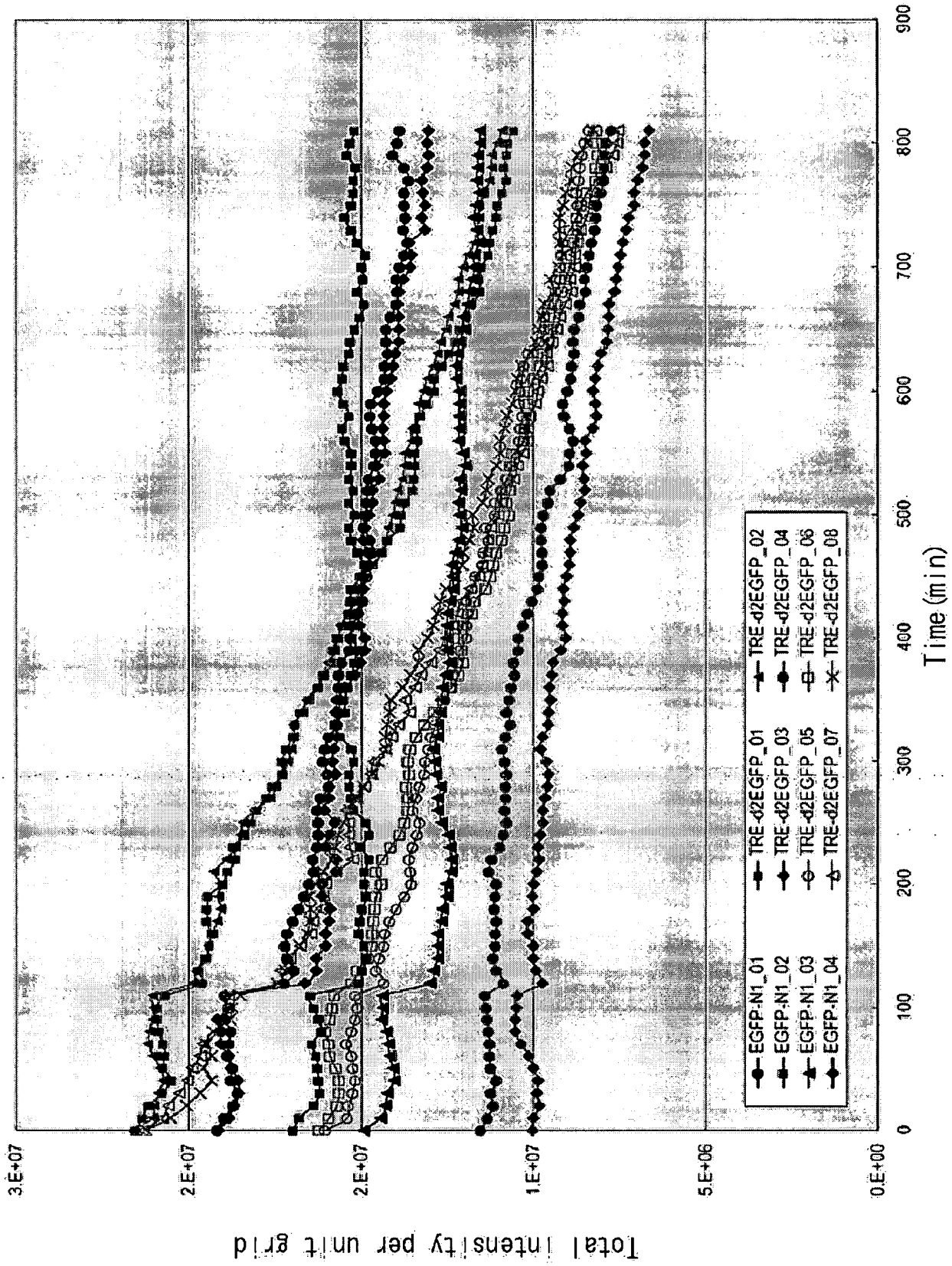

Anti-GFP siRNA
scramble siRNA
hMSC
HeLa
0.11
0.33
0.55
0.77
1.10
0.11
0.33
0.55
0.77
1.10
siRNA concentration [μg/μL]

FIG. 30


Total Intensity per unit grid
3.E+07
2.E+07
2.E+07
1.E+07
5.E+06
0.E+00
0
100
200
300
400
500
600
700
800
900
Time (min)
EGFP-N1_01
EGFP-N1_02
EGFP-N1_03
EGFP-N1_04
TRE-d2EGFP_01
TRE-d2EGFP_03
TRE-d2EGFP_05
TRE-d2EGFP_07
TRE-d2EGFP_02
TRE-d2EGFP_04
TRE-d2EGFP_06
TRE-d2EGFP_08

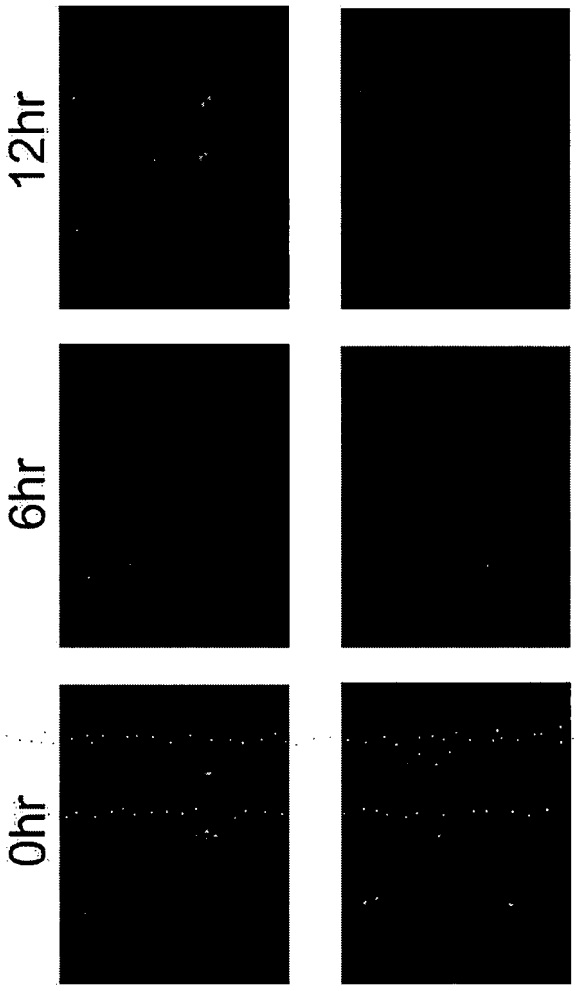
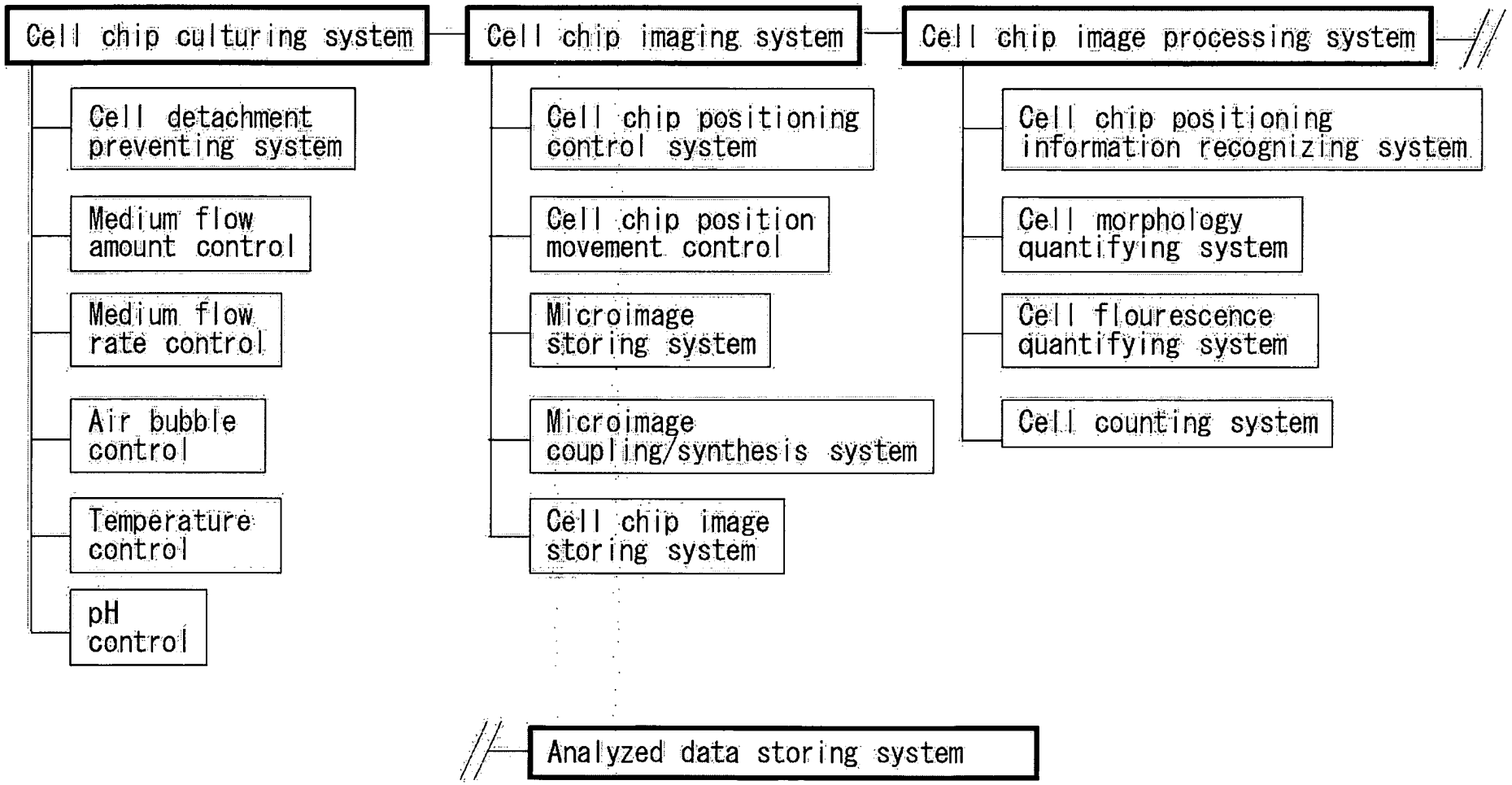


Fig. 31

Fig. 32


Cell chip culturing system
Cell detachment preventing system
Medium flow amount control
Medium flow rate control
Air bubble control
Temperature control
pH control
Cell chip imaging system
Cell chip positioning control system
Cell chip position movement control
Microimage storing system
Microimage coupling/synthesis system
Cell chip image storing system
Cell chip image processing system
Cell chip positioning information recognizing system
Cell morphology quantifying system
Cell flourescence quantifying system
Cell counting system
Analyzed data storing system

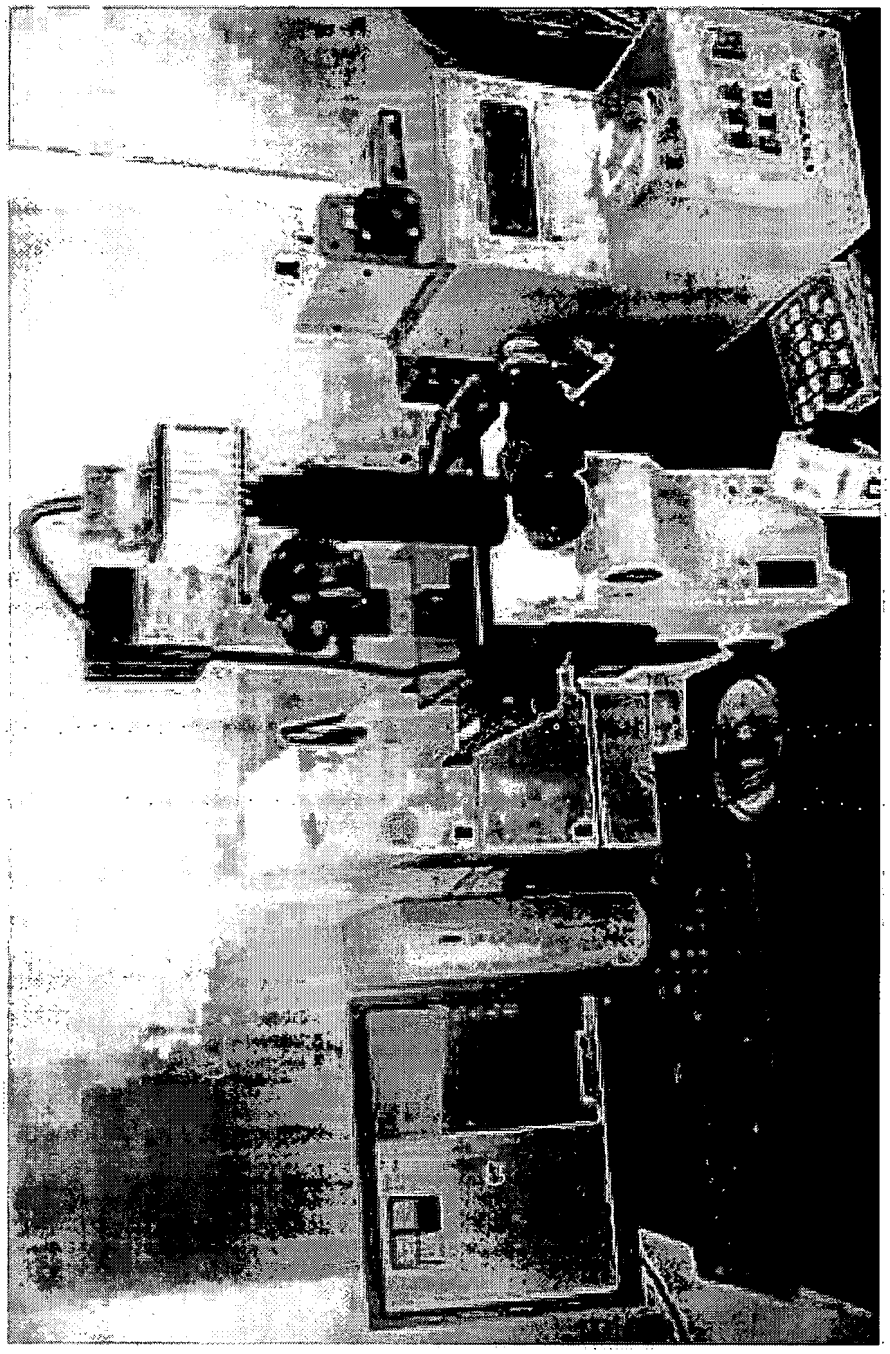


Fig. 33

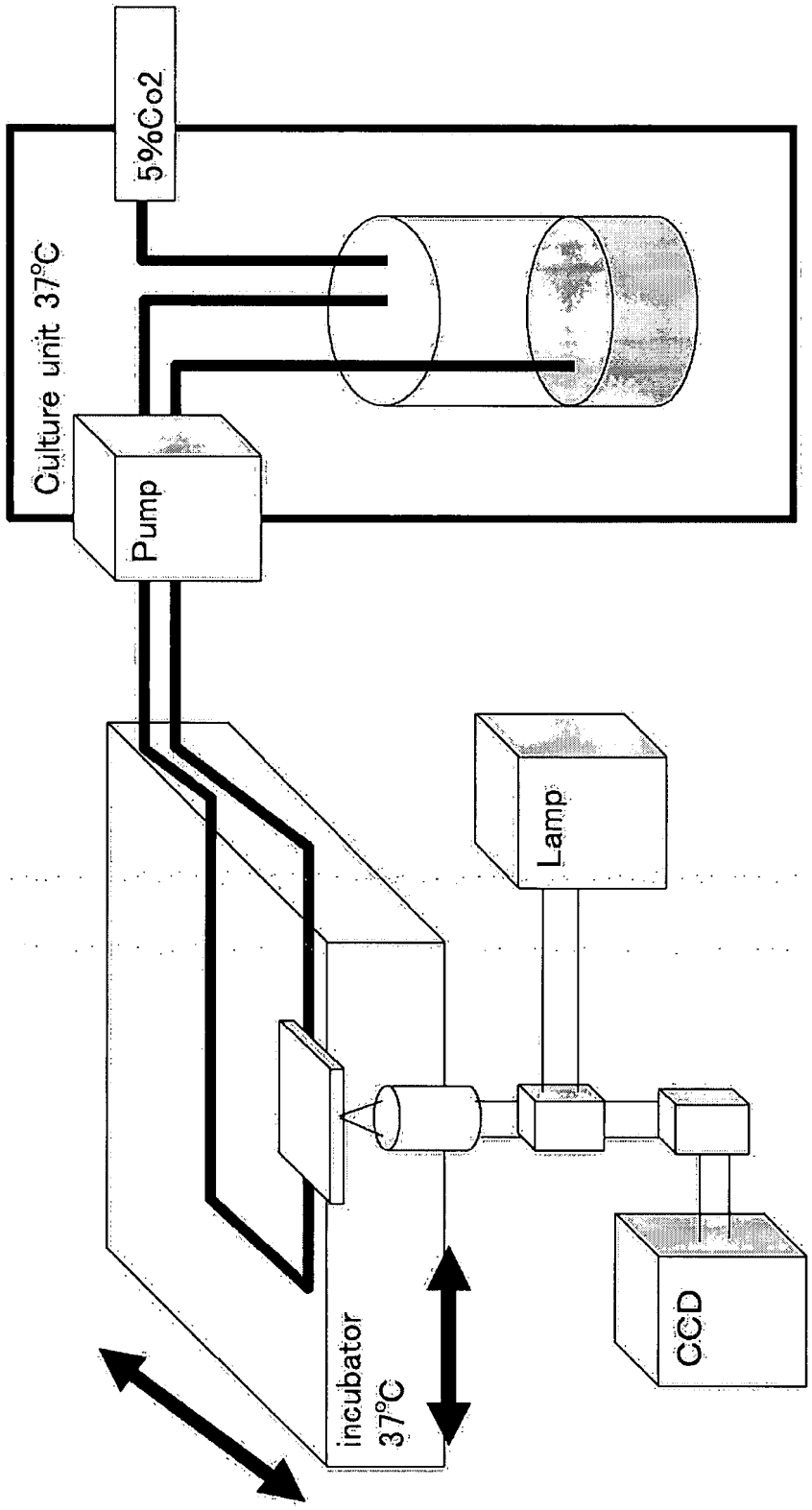


Fig. 34

Fig. 35

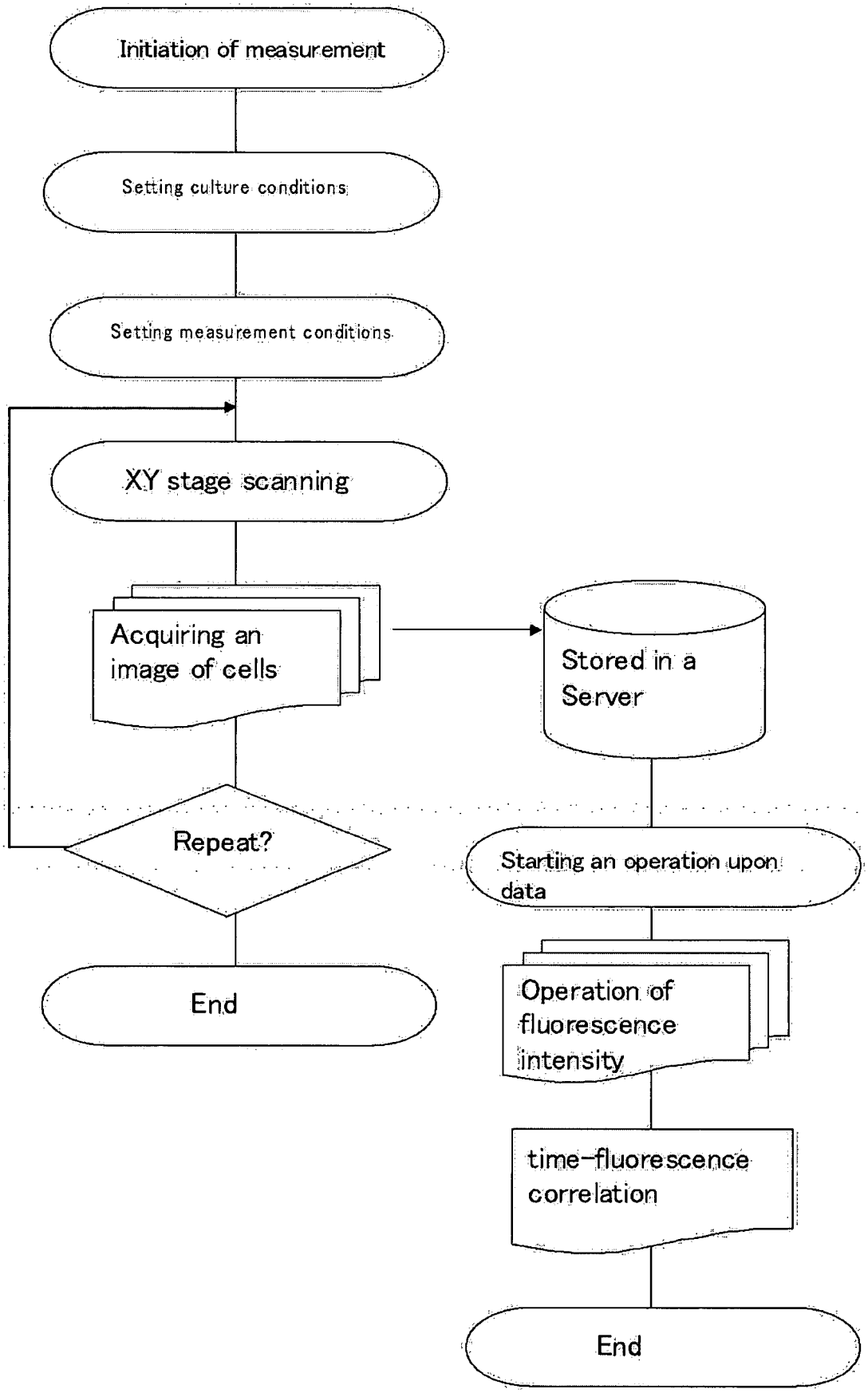
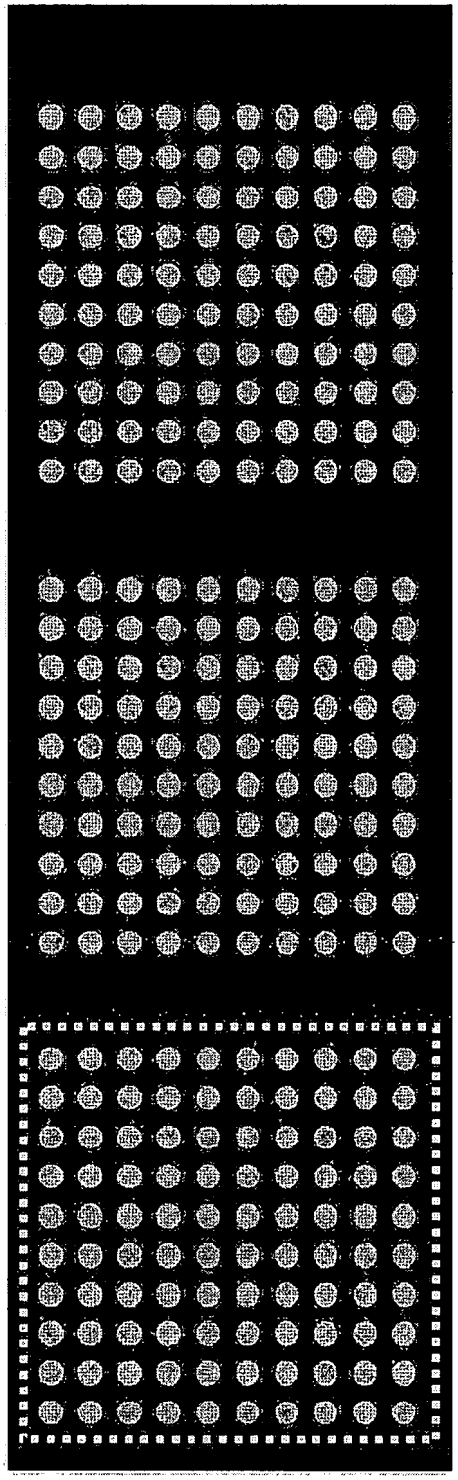

Initiation of measurement
Setting culture conditions
Setting measurement conditions
XY stage scanning
Acquiring an image of cells
Stored in a Server
Repeat?
End
Starting an operation upon data
Operation of fluorescence intensity
time-fluorescence correlation
End

Fig. 36

Format of Experiments



570 grid slide

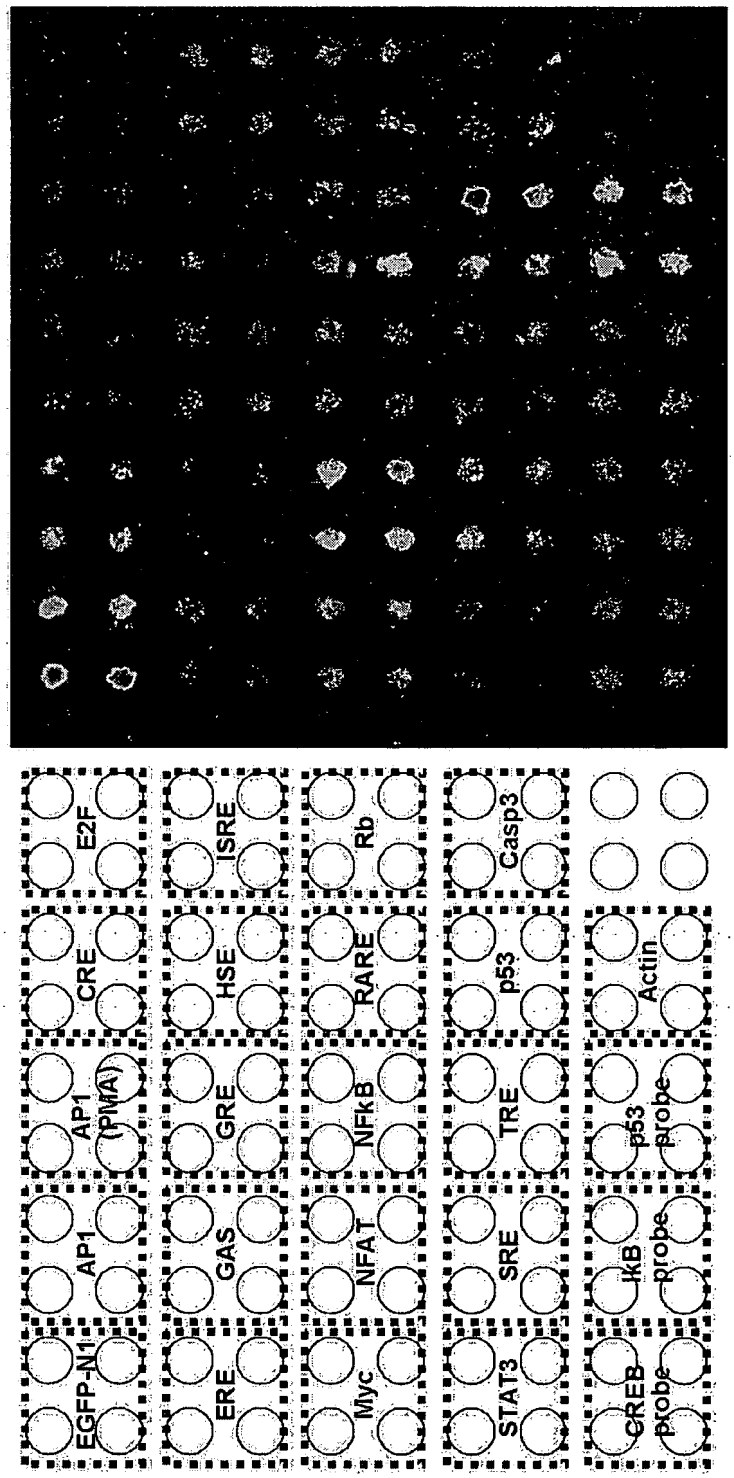

EGFP-N1
AP1
AP1 (PMA)
E2F
ERE
GAS
GRE
ISRE
Myc
NFAT
NFkB
Rb
STAT3
SRE
TRE
Casp3
CREB probe
kB probe
p53 probe
Actin
CRE
HSE
RARE
p53

Fig. 37

Fig. 38A Results (HeLa Cell strain)

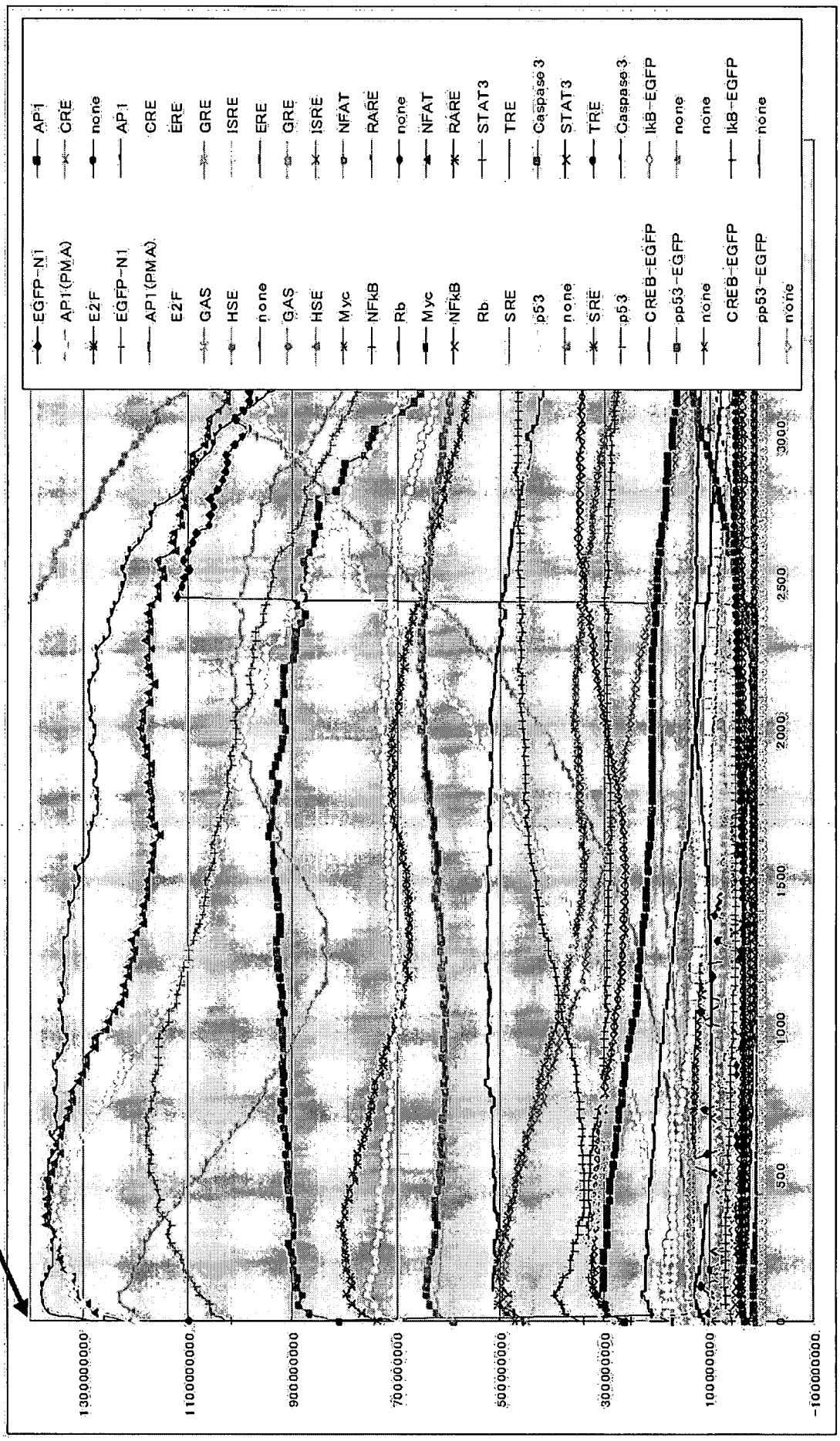


Fig. 38B

t	#1	#2	#3	#4	#5	#6	#7	#8	t	#1	#2	#3	#4	#5	#6	#7	#8
0	131846971	107021053	119151278	115001222	60181788	72578952	24282714	103114468	1770	105322910	64948202	95113647	84294954	52418689	65019400	23145557	67732656
30	134451985	107894767	122857833	122720386	68838381	80973487	28939215	116973499	1800	104506583	65502649	95499933	84745230	52088396	65147189	23490877	68340593
60	140354047	113097808	128086766	122937261	70879354	81007498	29413561	117546392	1830	100457983	65924657	96145135	87223611	52000027	65246036	23786561	68448770
90	135127114	110683443	124428392	114848994	72795014	85346853	31632821	121715629	1860	100869178	66346743	95770910	86640901	51365574	64934118	24381842	68228044
120	138986937	111820990	126071631	121370714	69284700	82412690	30124200	118642262	1890	100699983	66868156	96439868	87743949	51381145	64491699	24616221	67987812
150	139231204	111510471	129776876	122180796	68744394	83797070	30032617	117512581	1920	99776591	66739357	97319114	88407893	51642720	62469426	25077546	68750853
180	139382051	111678196	131330883	123718176	68349785	84728536	30433108	117683460	1950	101366546	67166966	95366923	88015728	50410209	62384228	24924564	69334820
210	139391269	111072765	131442707	124048095	67783148	84584143	30145205	117950409	1980	101495006	67318419	96199166	88489672	51253664	62832515	24904999	68642956
240	137815611	109338612	131631733	122103264	67554325	84918465	30395891	116678168	2010	102297162	67719495	97144172	90516943	50674681	62786025	25198400	68774799
270	137950180	108815023	131301086	120422706	66310409	84722404	30378410	115181667	2040	102656981	68330783	97405421	90272600	50675313	63264232	25398343	69520617
300	136070787	105767037	131061594	119120615	65653080	84236500	30190912	113655290	2070	103964829	68349822	97493770	90541068	50821998	63747553	25707582	69362122
330	135868692	104686932	129864920	117626536	65582066	85905002	29954900	115402355	2100	103603280	68738298	96998261	87424808	50906841	62839807	25236523	69306052
360	135790350	103722384	129839038	116783082	65349430	85976878	29779244	114873250	2130	102699521	69264374	96190028	88818843	49802662	62446635	24946255	69632944
390	135270416	101982108	128508503	115832507	64254234	85962538	29209193	114513652	2160	103400704	69725979	94552320	88540037	50628141	62595780	25145669	69740934
420	135154900	99496833	127144112	114731896	63281454	84693882	29017565	111973268	2190	103727077	70420359	94473758	88386638	50427011	62362626	25167625	70188667
450	134348428	97506154	126472490	113945948	63383715	84963620	29278131	112634585	2220	101854014	69806097	92491372	88433384	50464098	61557266	25155570	70396049
480	134488233	98045189	125952544	112932584	62460643	86022494	28800906	111598184	2250	102028092	70360627	92692076	89582488	50199331	61602318	25218991	70360574
510	134829916	96601977	125741989	111068793	61644282	84821638	28190380	110427198	2280	102154875	70393537	91913008	88804552	50369943	62049361	25290410	70408935
540	133349371	96356917	126274332	108369962	61396669	85631764	27741874	108064077	2310	100659775	69845449	90988570	87894515	47543813	61775859	25193905	70891622
570	129625398	95140023	126679700	107770289	60527134	84186661	28164319	107556086	2340	100624095	65330456	90739489	88749169	47566142	62901005	25270120	70093019
600	129768103	93314758	125411482	104323800	60681496	84141929	27600351	106741665	2370	100707159	65040567	91263725	89712153	46615016	62521334	25063903	69411561
630	129977116	92430983	125047544	104772646	59049329	83202321	27306758	105614103	2400	100650316	65537842	90322183	89526685	45872070	63252882	25150769	69103213
660	128163514	90032772	124870358	100972677	59673914	83978923	27217770	103993748	2430	102482171	66973986	90476617	89693643	45060215	63958898	25586520	70203632
690	125801897	88904991	123570533	101712740	57687685	84150812	26928592	103170500	2460	100958146	65160183	88505939	86410517	43848201	63071497	25605133	67234853
720	125925415	87908198	123064384	100244137	56964582	83836341	27008980	103722366	2490	101139338	64734324	88491643	86669978	43639965	63347304	25324382	67741821
750	125367660	87057412	120719703	98212103	56207749	82990816	27009884	101632337	2520	100274865	65277633	88252591	86380010	43637465	63225341	25160808	67652523
780	124197804	84808149	121110019	96045385	55741066	81534786	27043023	101452269	2550	98877249	64598928	87124517	85690599	43419603	63663380	25166222	68038842
810	125624036	84694968	121178380	94346438	57072256	79976718	26902374	99411088	2580	99777795	64894956	86723267	86502580	37776213	64072719	25316796	68207253
840	124512900	83987566	120066053	93562312	55392563	80602389	26227324	98674126	2610	97455822	64371955	84530365	85594440	38366987	63736070	24740382	67169360
870	123482642	82255507	119449861	91848781	54608975	80205625	26406085	98445125	2640	97114851	62737861	83525514	84129796	38345830	63010342	24768881	67903630
900	121861367	80320204	117653941	90175926	55596195	78570864	26249152	95557166	2670	96298850	62619278	82892172	84303073	38589094	63015466	24326059	66899483
930	121000814	79935834	117857470	87894345	55204079	77613609	25969646	94884861	2700	96790138	61938875	83084975	84157516	38492352	61971793	24380118	66199817
960	121217439	78721664	117498607	86174510	54690778	77950176	25684231	92473467	2730	96427294	62032720	82973219	83970747	35822973	61773658	24109968	63896612
990	119699559	78367429	115712520	84011164	52725908	75918983	25837336	91872351	2760	95160617	61348596	82696864	83815693	35662484	61181782	22506697	63444596
1020	118828214	77245641	112878956	81128461	53202010	76080460	25335940	89714563	2790	94289850	60963400	82153786	83389363	35660585	60573812	22166568	63947493
1050	120428518	76724895	112303381	80564403	52301600	73901401	24803954	89282217	2820	93315888	60873501	80815892	82051319	36021177	60428169	22068989	63436228
1080	117339882	75455791	111254118	79884027	52137789	74234664	24743484	88199600	2850	92786669	61023543	80110815	81908528	36058633	60542073	22181822	62931729
1110	115298544	74456514	109978423	78142627	51877076	73940594	24440233	86410805	2880	91942511	61649178	80214430	79209190	35516431	59853555	22047843	61920688
1140	113373592	75449009	109136081	77557038	51919351	73163376	24515029	85587808	2910	90996637	61440342	78170560	78783029	35476953	60291853	21461284	61947408
1170	114665693	74072956	109000816	76606585	51022260	73357873	24387934	85170827	2940	90203892	61236413	78621644	79259773	35292931	58491344	21242055	61783759
1200	114132828	73690480	107263956	76621755	51799575	73558988	24379387	84648706	2970	88967317	59522577	77093589	77679630	31896587	59132020	20063381	61054815
1230	112602759	72698494	105640142	76396837	51796705	71745699	24434965	83411094	3000	89291717	59373037	76814793	77710615	32059088	58437220	19139287	61260020
1260	111009652	71888671	103149178	74847542	52490852	72609640	24344763	81657191	3030	85905320	57138722	74497772	76601355	31903665	58227651	18884521	60029287
1290	110047755	71383154	101648986	74726667	52261727	70890831	23751970	80024916	3060	83868139	56445199	73730258	72048347	31416138	58160390	18212490	59628851
1320	109932718	70061682	101464739	74165877	51682935	70305211	24171020	80773835	3090	84509915	56203798	73352672	72883858	30509969	57238110	17855753	59050836
1350	109827085	68975824	100462007	75088530	52489112	69917340	23795008	79150373	3120	83289744	56064765	73214703	70998969	30276813	56454083	18143794	58444721
1380	108724271	67640615	98977468	74444528	51344046	70253547	23677421	77528309	3150	82387342	55380177	72158575	70766817	30484186	57133900	17538418	57936605
1410	106915024	68018893	96497904	75099037	52188667	69605033	23618713	75858150	3180	83372063	55051640	72237427	69883759	30496310	55048572	17445909	57482810
1440	105940641	67429779	95653785	75126295	52726840	68949316	23300886	74726905	3210	81361665	53905736	71459809	68578035	29221828	54364114	16820894	56896238
1470	104960405	66253365	95107743	76469640	52610902	69104073	23414560	74606369	3240	79401154	54075372	71002908	67853168	28678942	52914379	15896562	55596994
1500	104424521	65958943	94511582	76305188	51608752	68453682	23527429	74917093	3270	78124334	53814753	70726638	67532930	28257104	52748508	16098944	50705707
1530	104959292	65605726	94201167	76514580	52138960	67873825	22724363	74352733	3300	77913928	54325196	70929785	68194462	28003773	51884736	16125926	50087433
1560	104776748	65268092	94016753	77374669	52482829	68892619	22849883	73932456	3330	77248420	54031138	72262709	64752752	27911259	52312550	15962597	49621129
1590	103261499	64878730	92709198	78357502	51781084	67276825	23074659	73498933	3360	77019465	53996105	70077476	63440200	28027324	51981829	16051183	49366940
1620	105470523	65404767	93195444	80351759	52451967	66418651	22999513	72602128	3390	76617107	52732984	70286428	63659106	27282791	51164093	15928955	47123766
1650	103477466	64903465	93459882	79643691	52208404	65381025	23101788	71122562	3420	75050043	52686537	68847930	62836112	26788805	50287342	14257277	46700987
1680	103899492	64826184	93515113	80828986	52196717	66048909	23423746	70827774	3450	75002986	52771400	64338066	62415088	26402025	49725603	12215883	46667448
1710	103584921	64873250	95310568	83049717	52352457	65898325	22891952	70110913	3480	72914273	52786206	62942485	61293955	26206084	49319510	12059247	46012364
1740	104426757	65204624	95617227	83702546	52430985	65370529	22965109	69051817	3510	72474115	53315973	62755715	59233688	25394483	49141615	12005823	46266059

Fig. 38C

t	#1	#2	#3	#4	#5	#6	#7	#8
0	133336219	108191971	121331814	119456098	65650027	76613085	26347195	111362893
30	135226201	109690390	123405608	119575883	66922317	78535716	27765405	113689929
60	136634878	110642831	125098136	119812134	67830100	80176951	28834431	115430681
90	137634525	111130735	126458159	120096092	68423253	81564709	29610833	116670156
120	138268691	111226226	127538850	120370442	68746827	82724060	30144292	117483351
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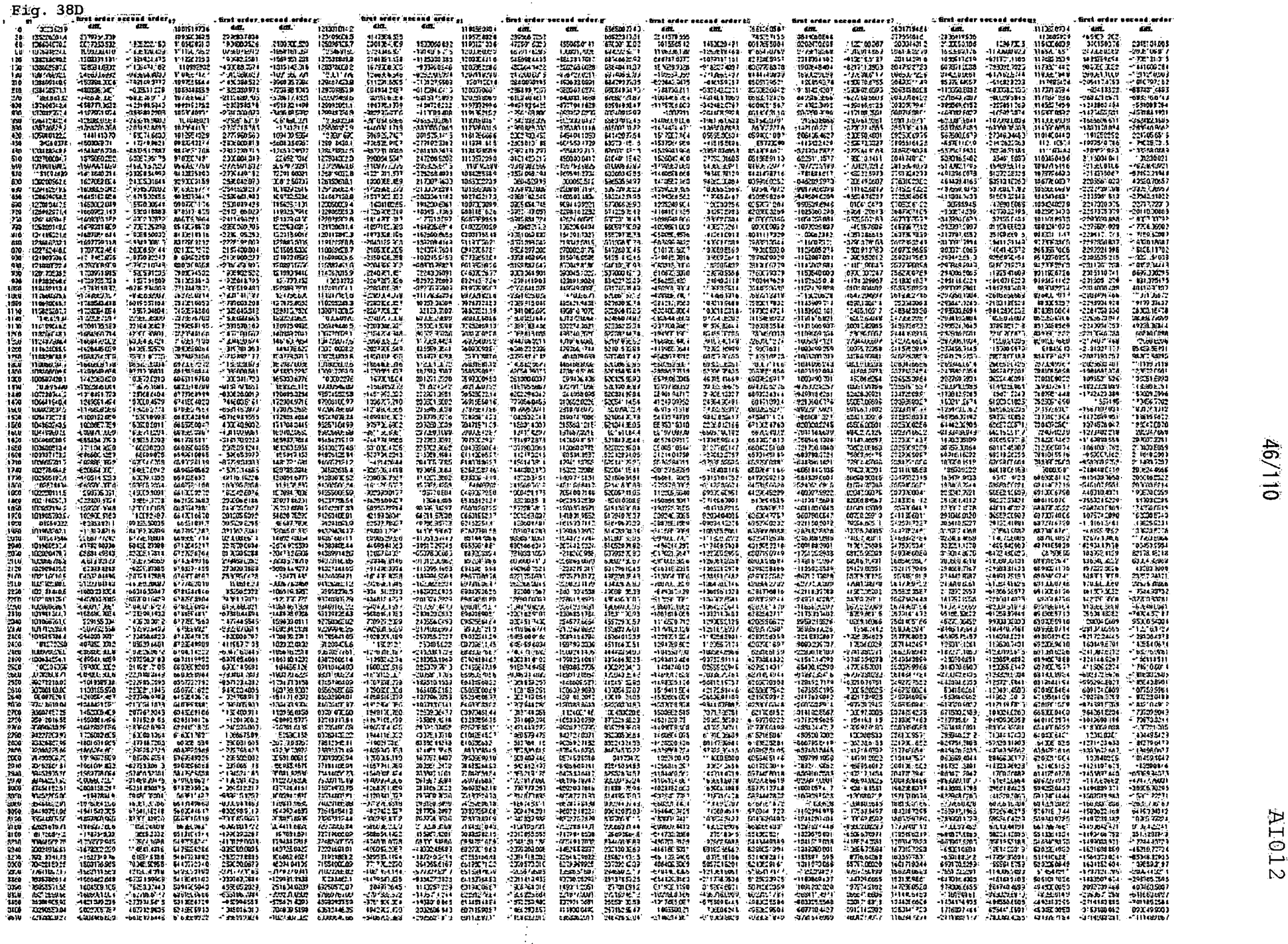
Fig. 38D



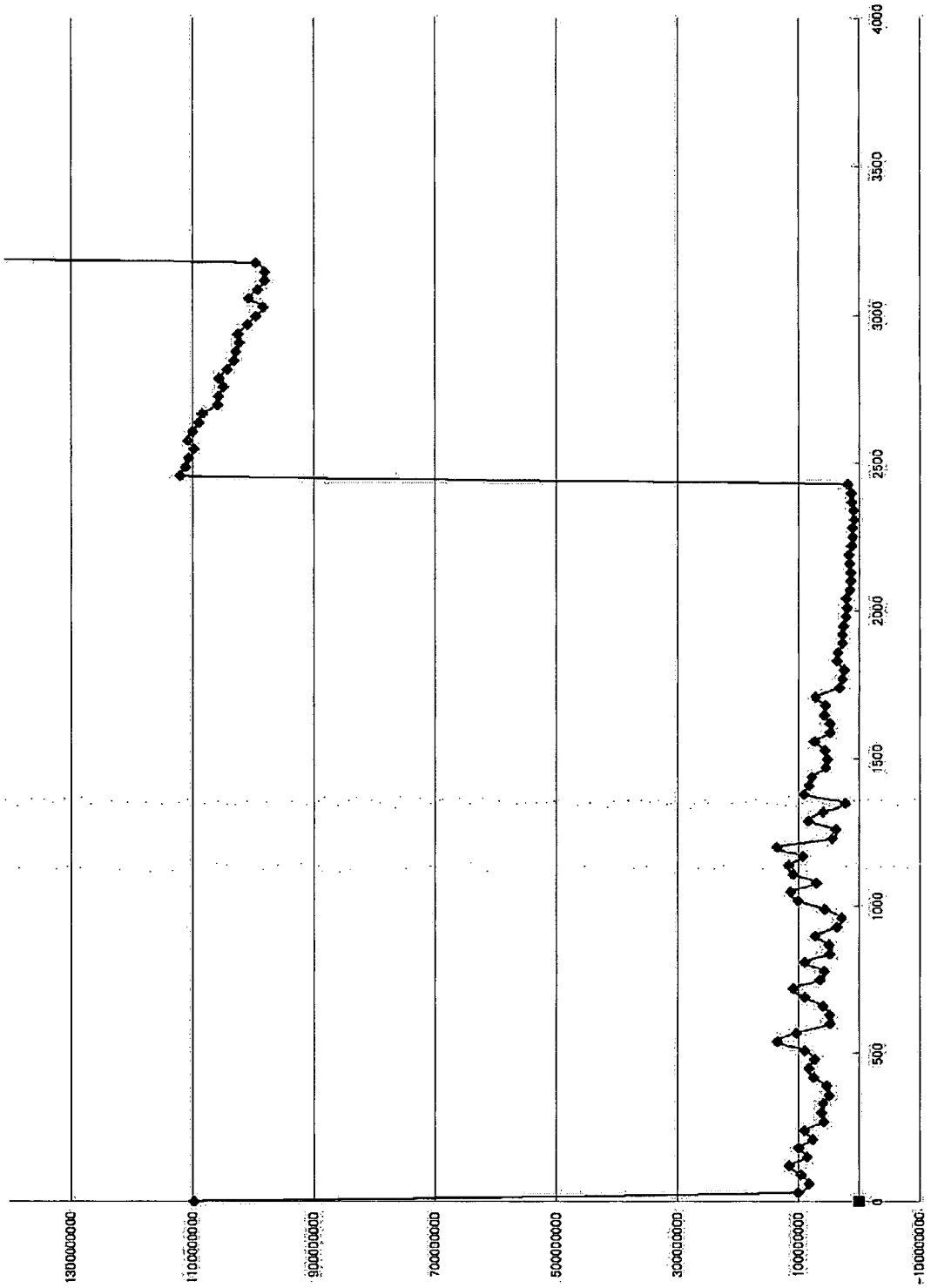

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Fig. 39-1

Fig. 39-2

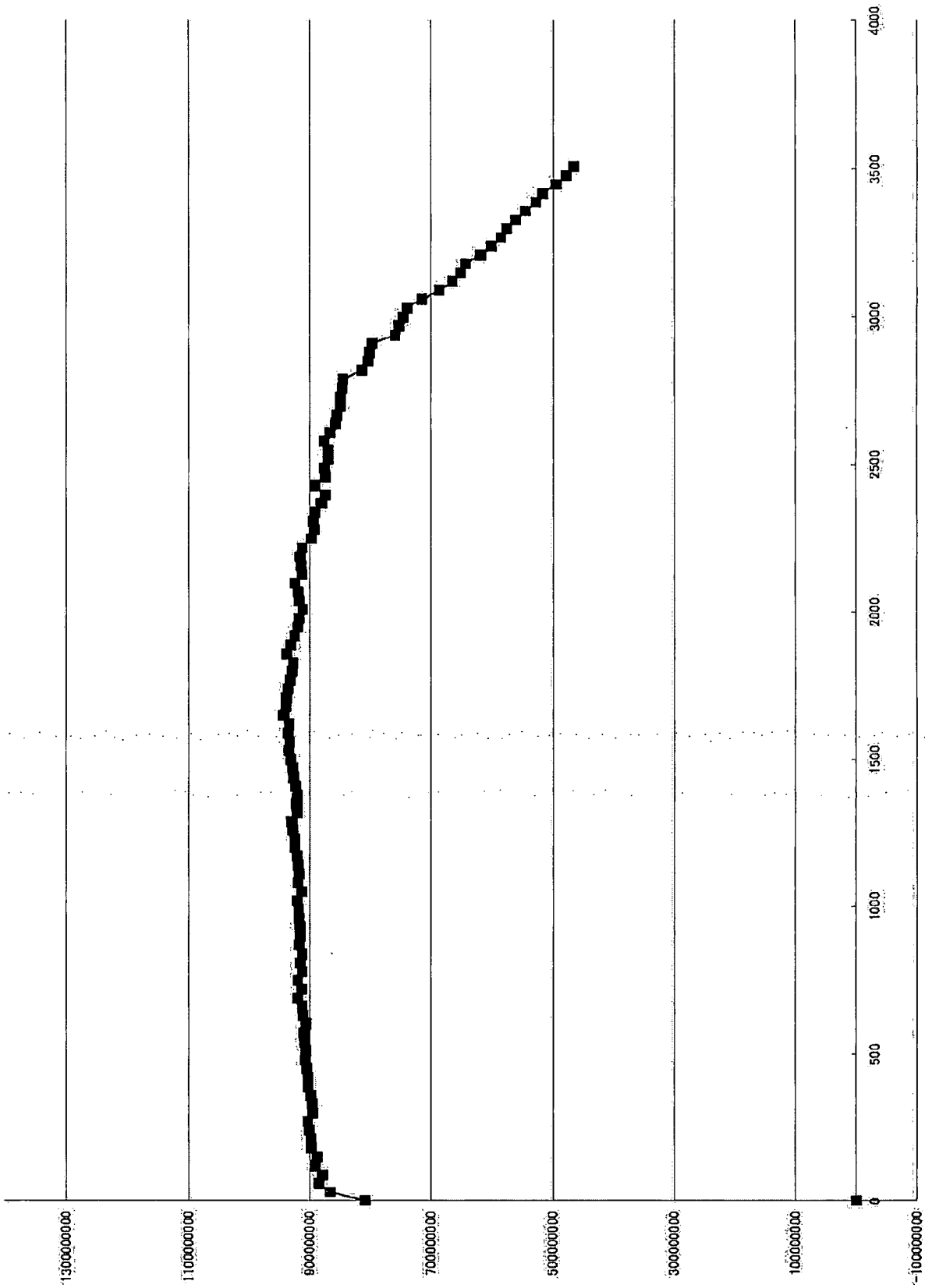
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Fig. 39-3

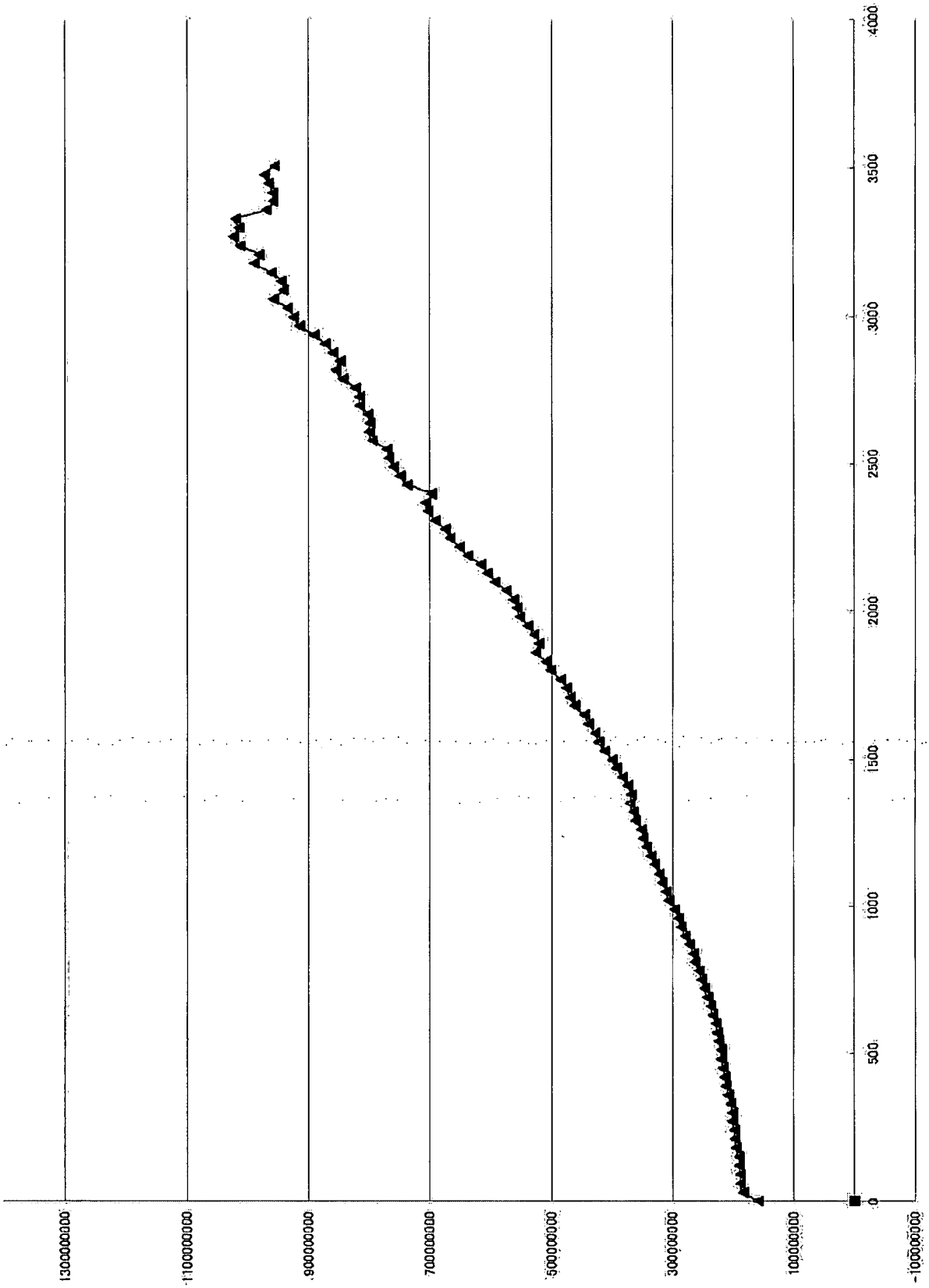
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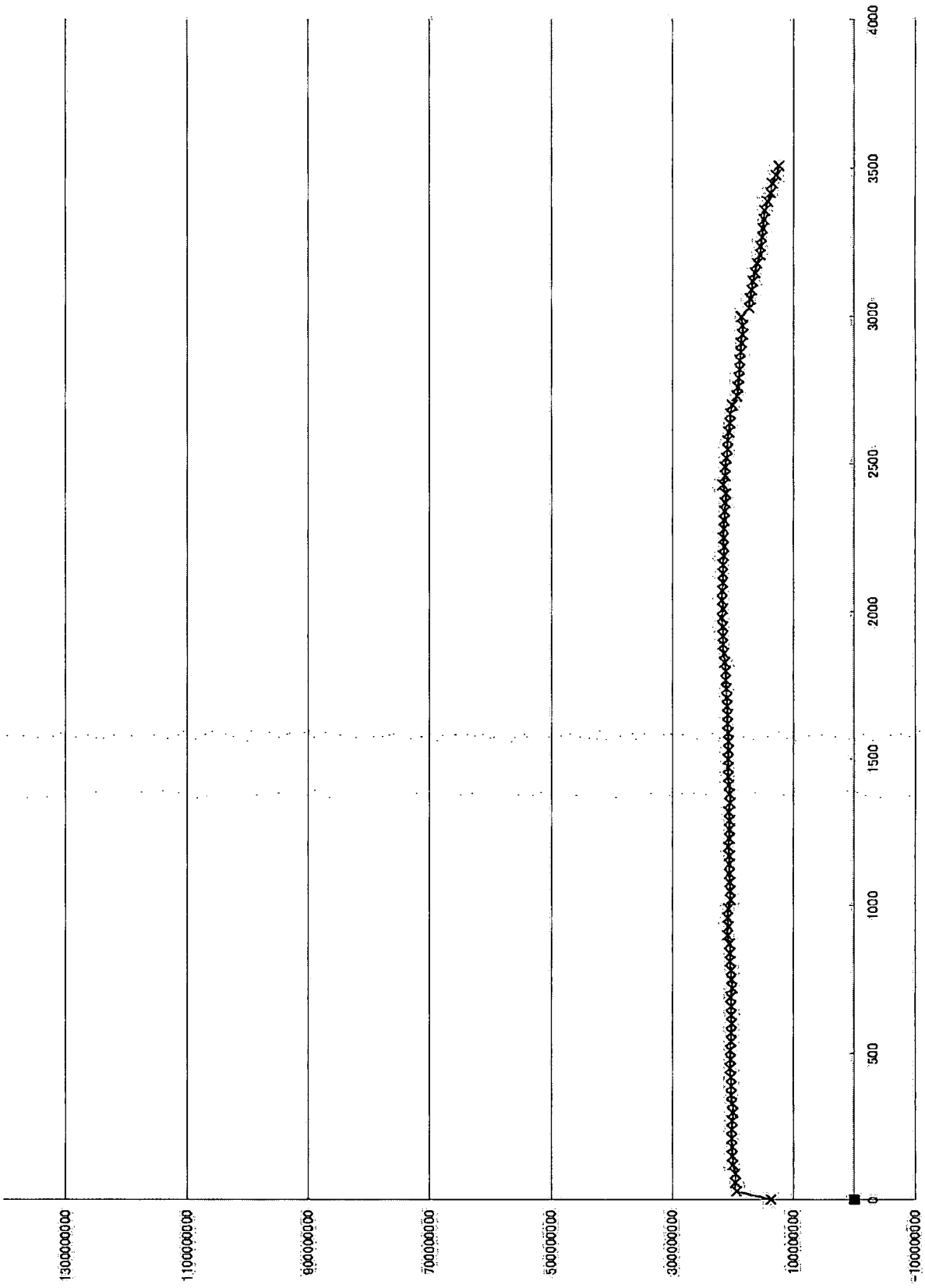
Fig. 39-4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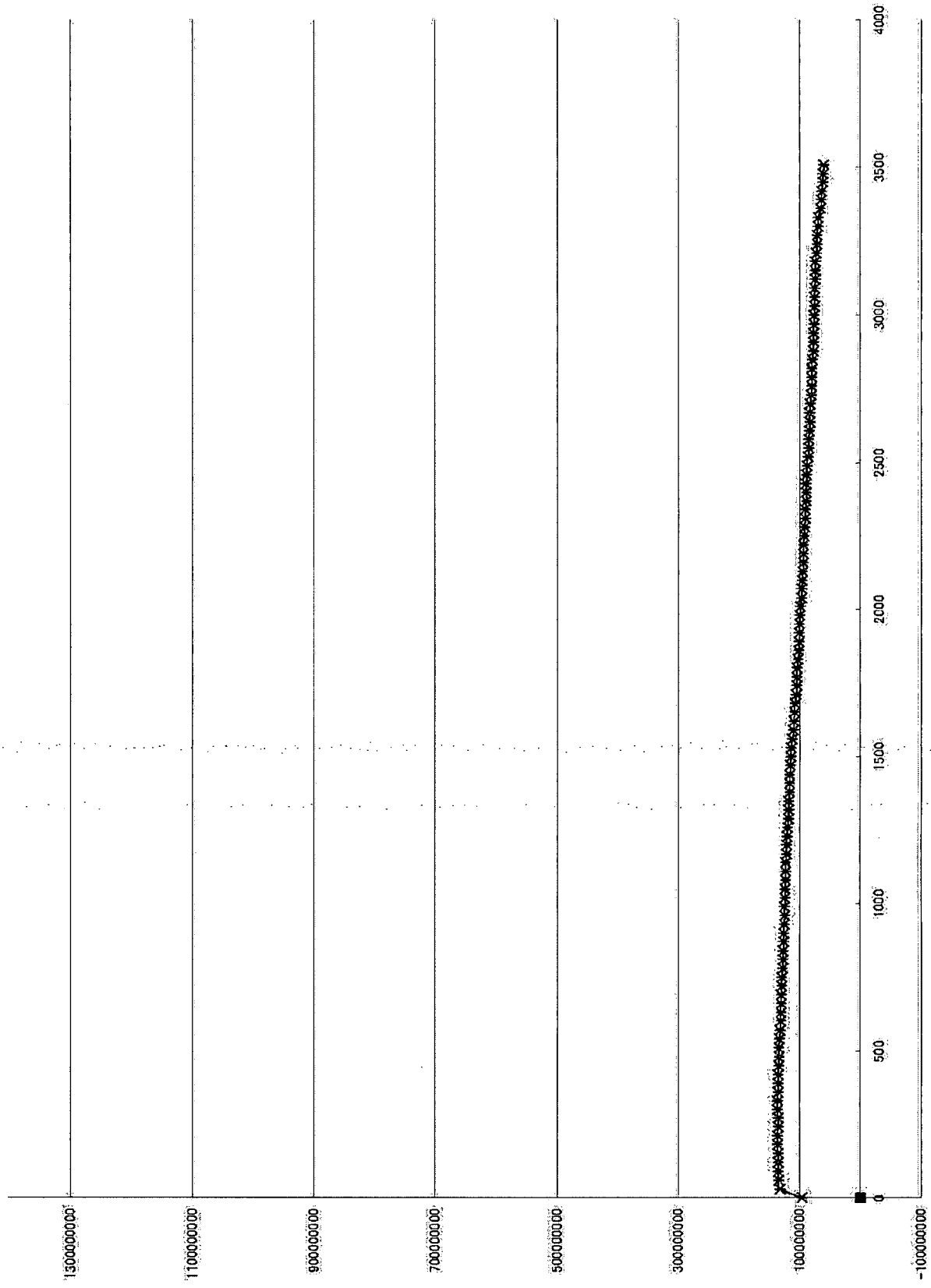
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Fig. 39-5

Fig. 39-6

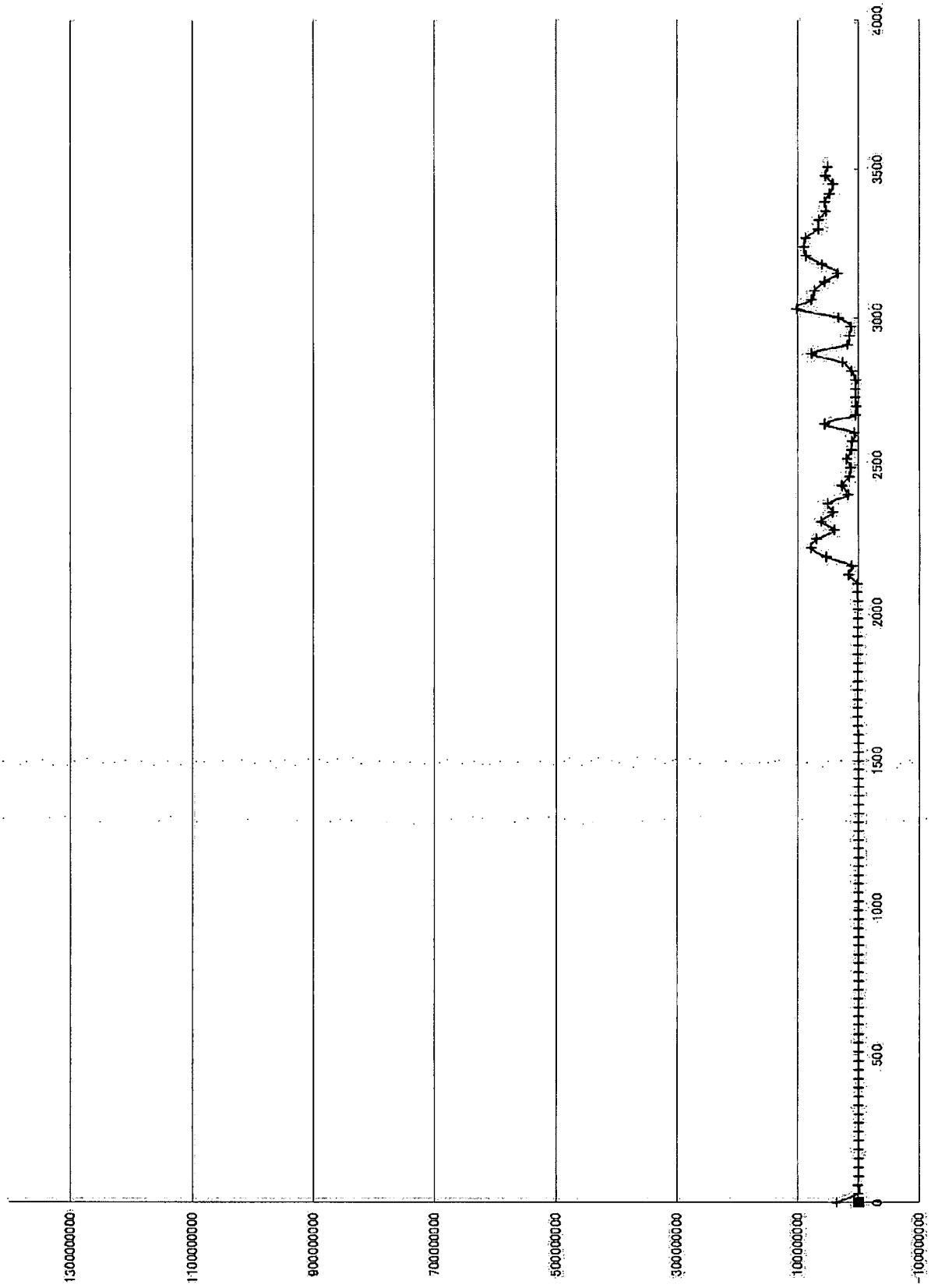
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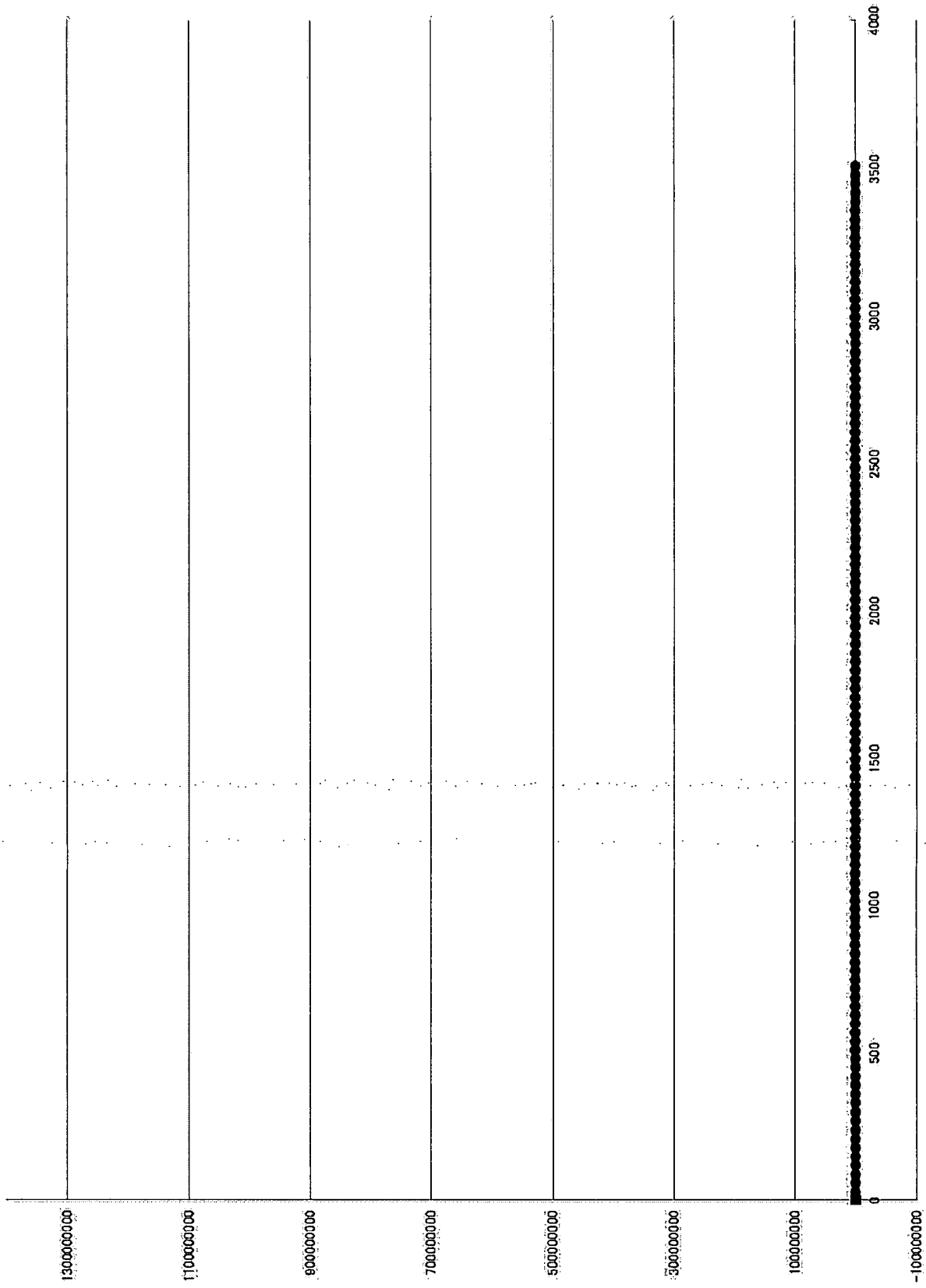
Fig. 39-7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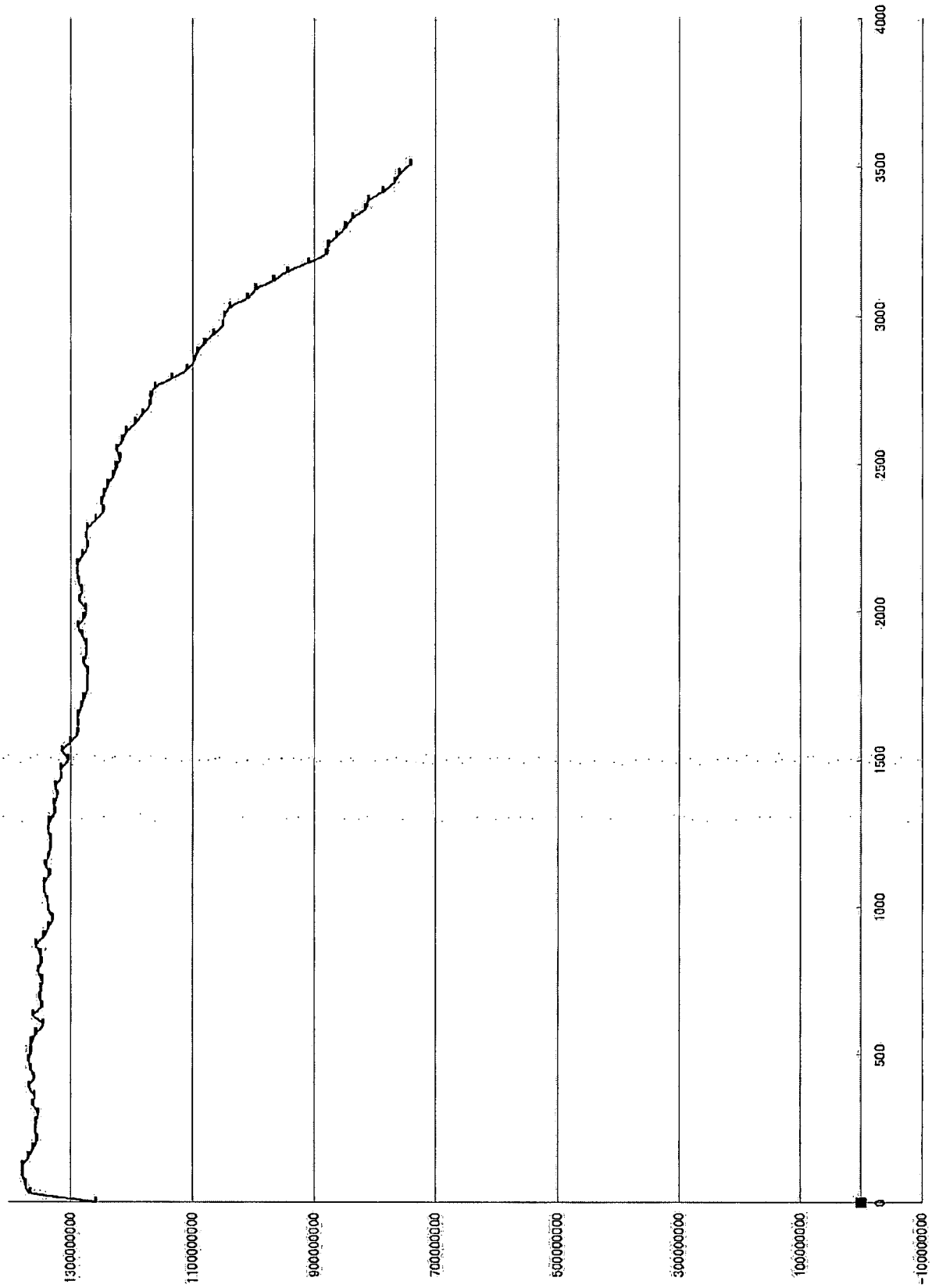
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Fig. 39-8


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Fig. 39-9

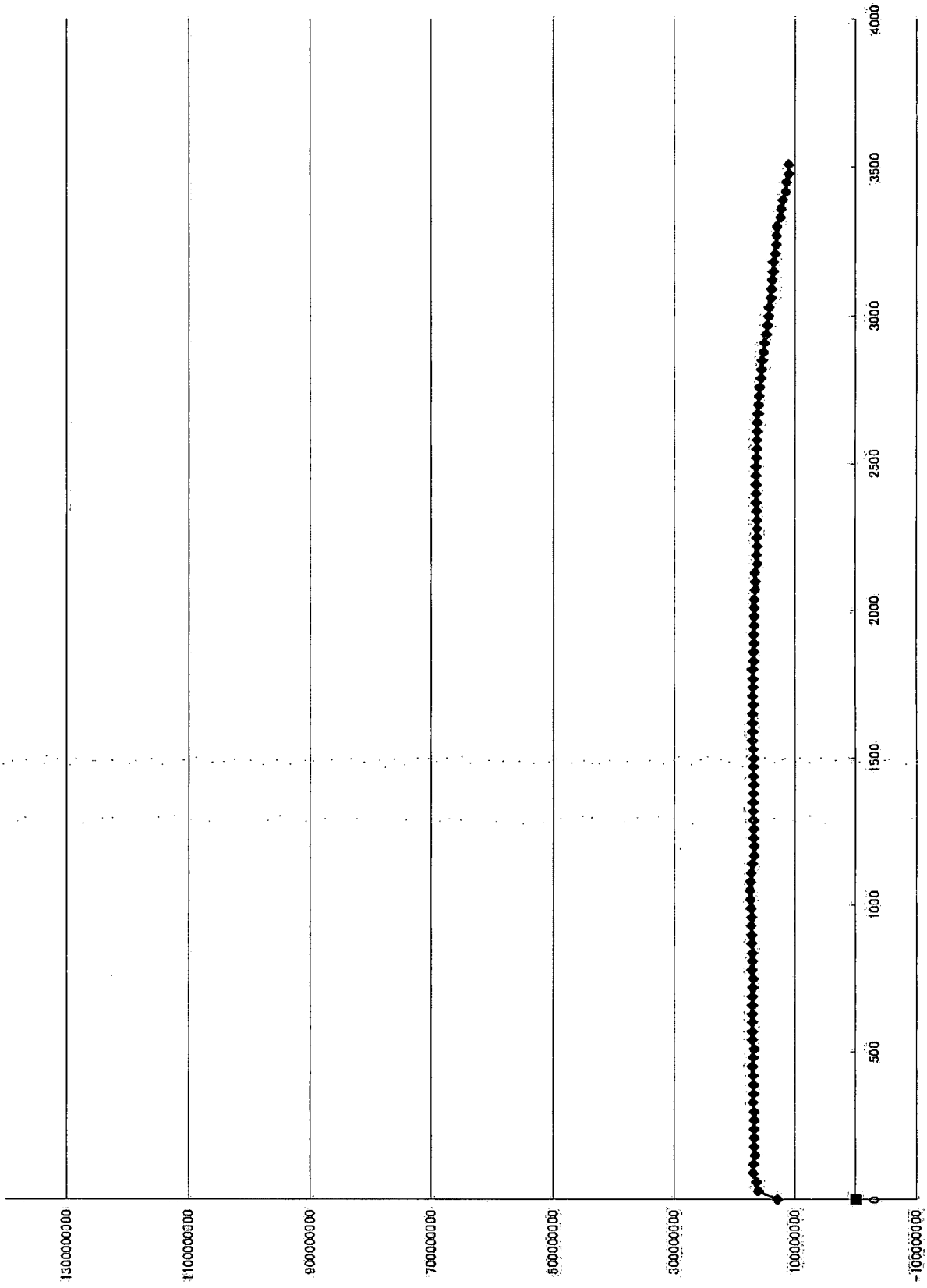
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Fig. 39-10

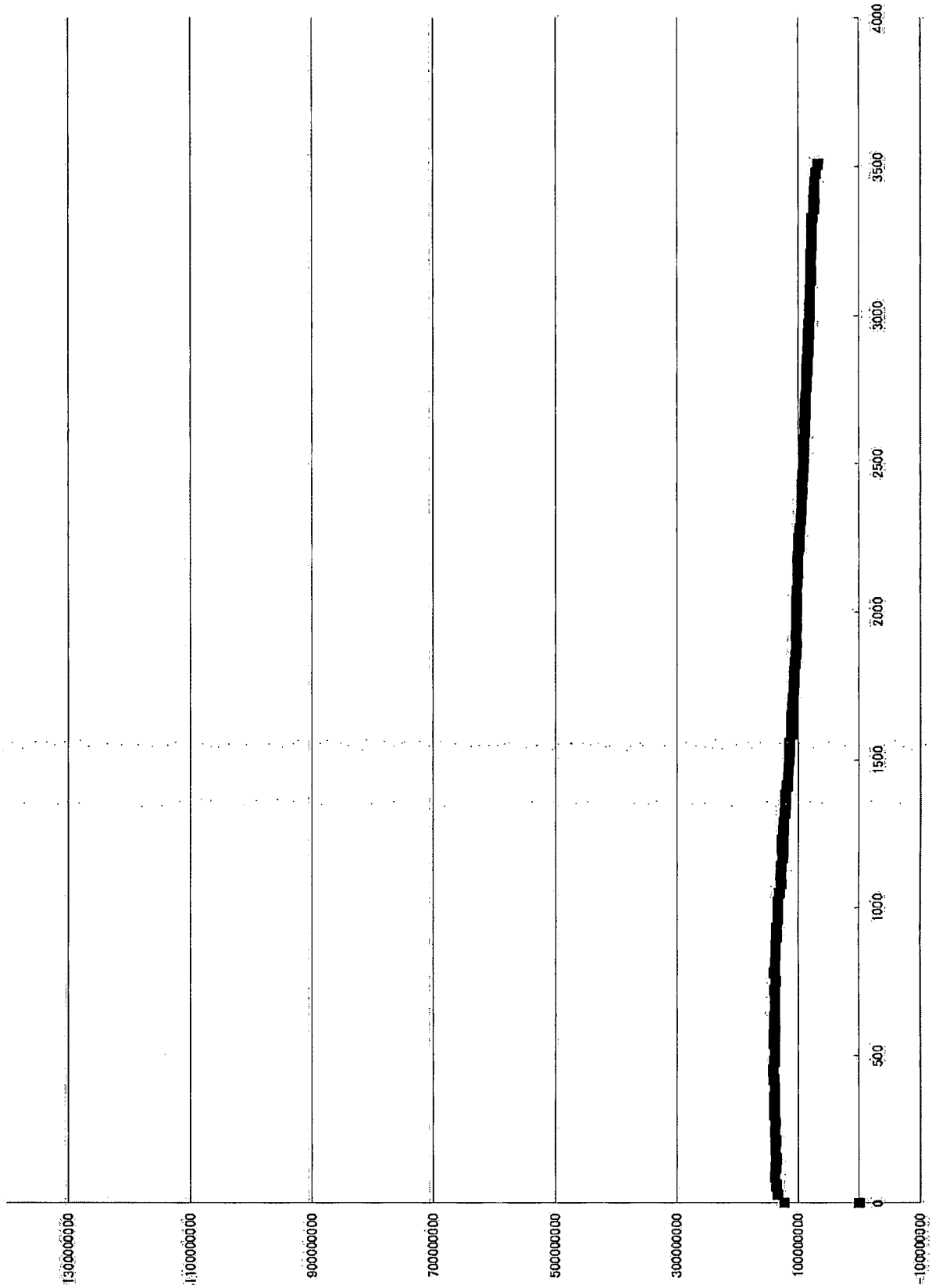
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Fig. 39-11

Fig. 39-12

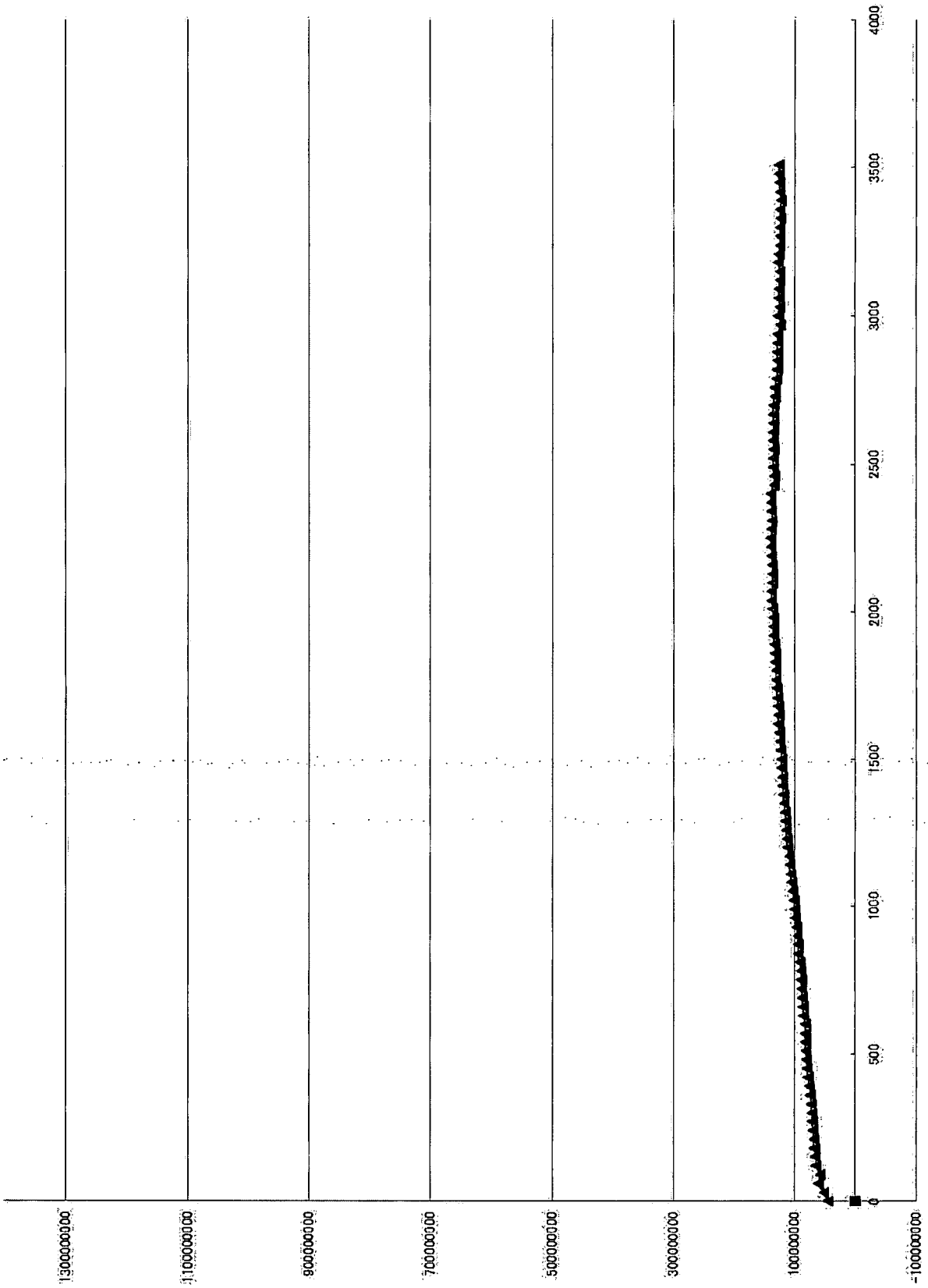
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Fig. 39-13

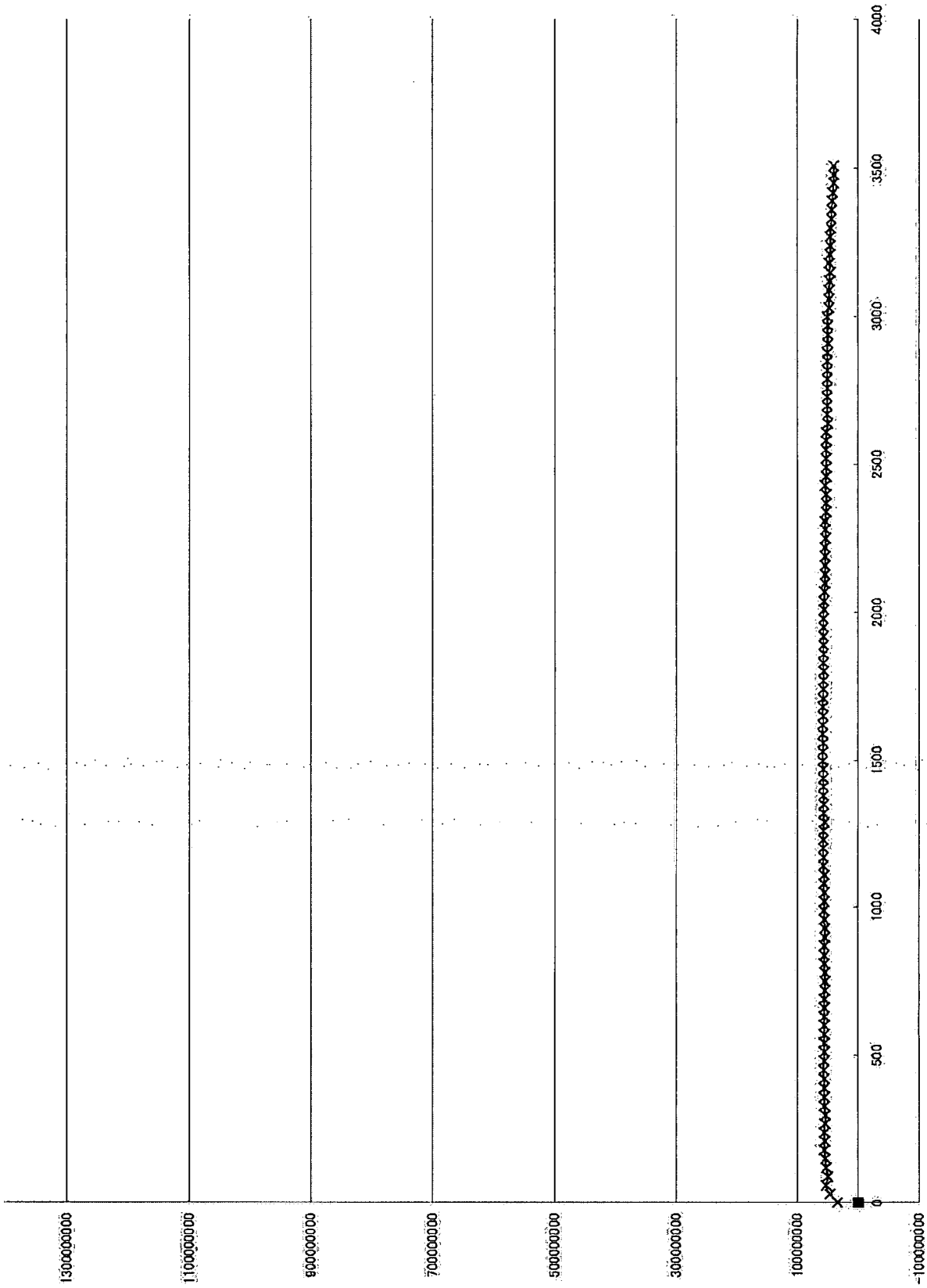
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Fig. 39-14

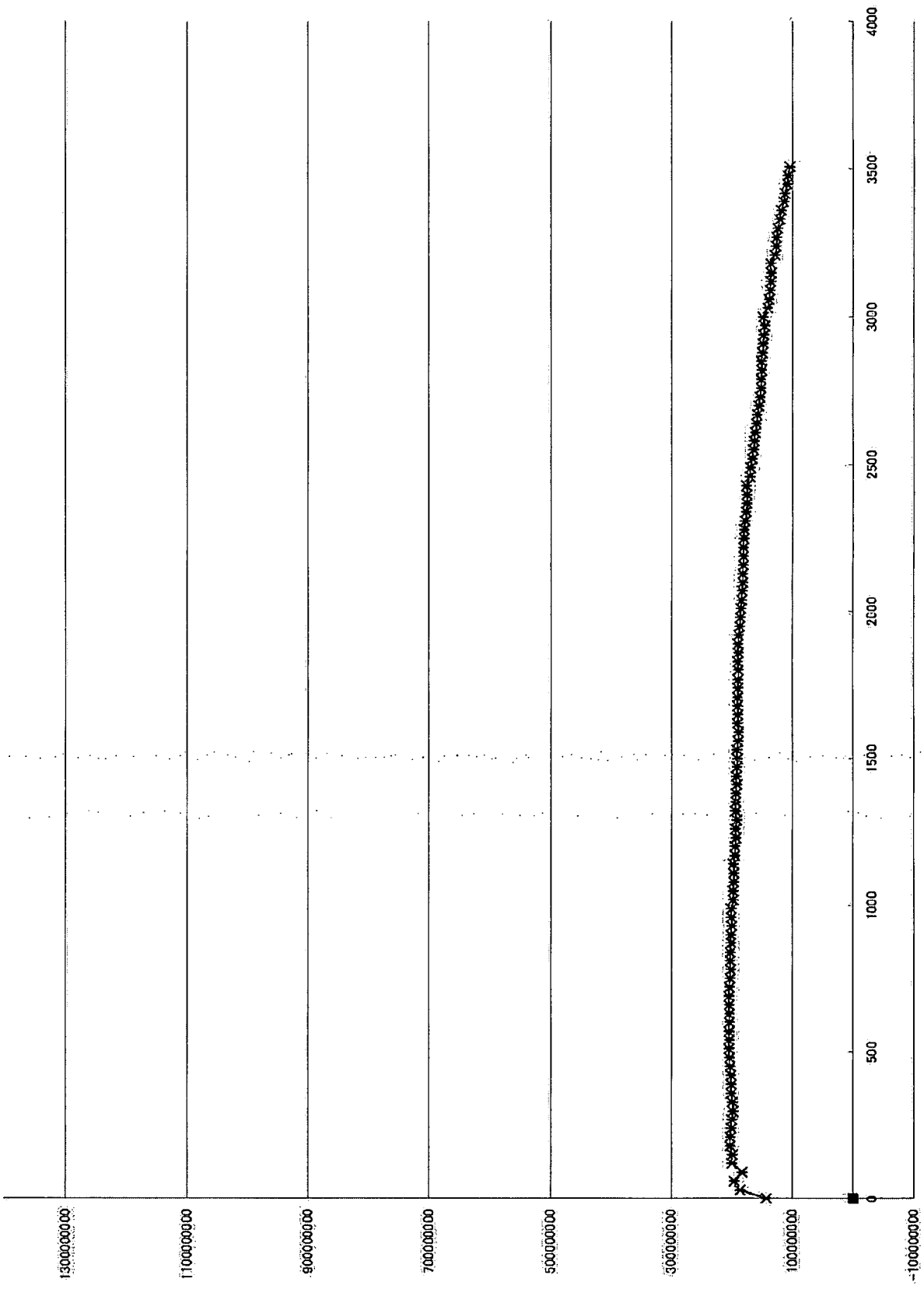
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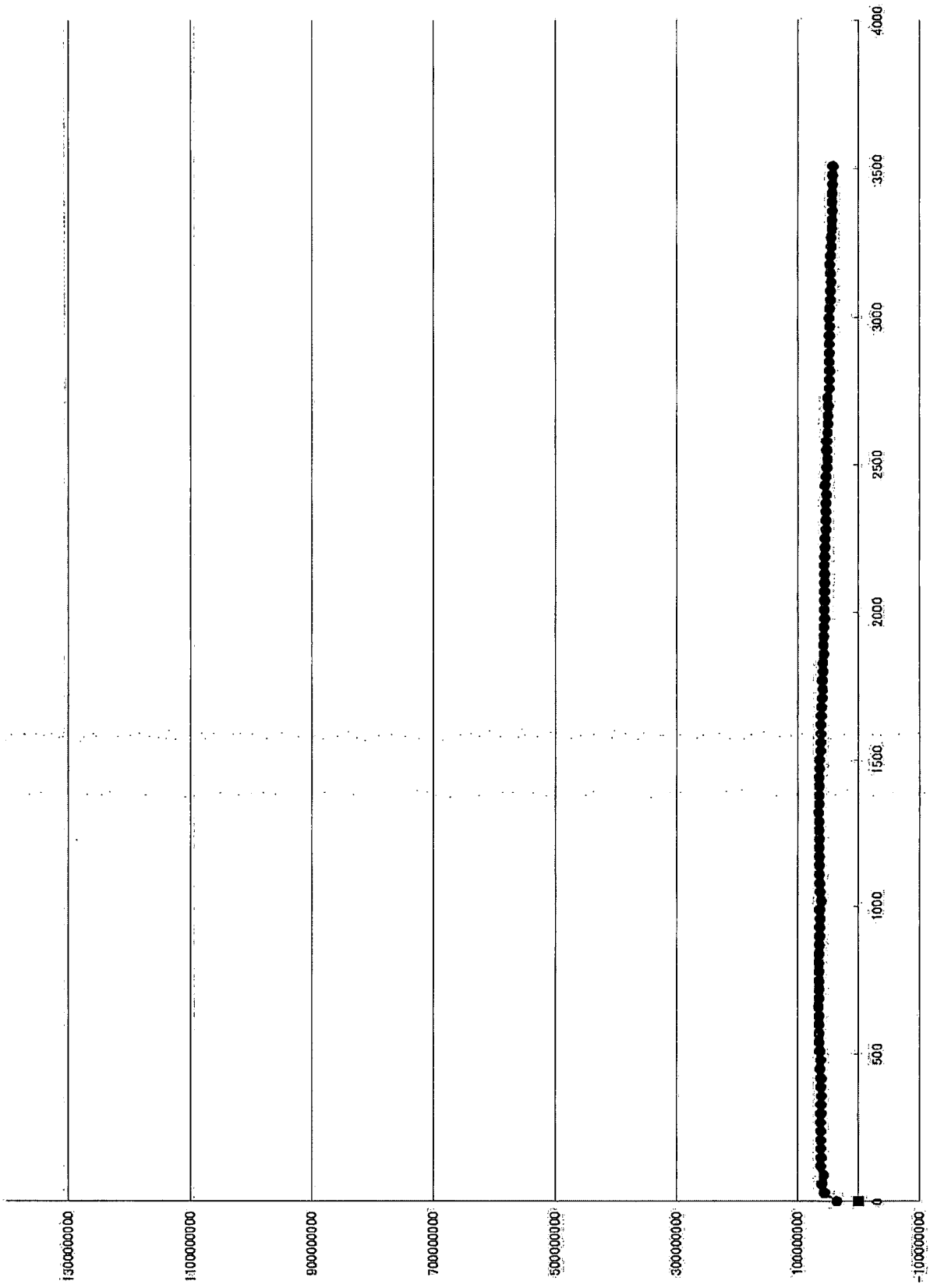
Fig. 39-15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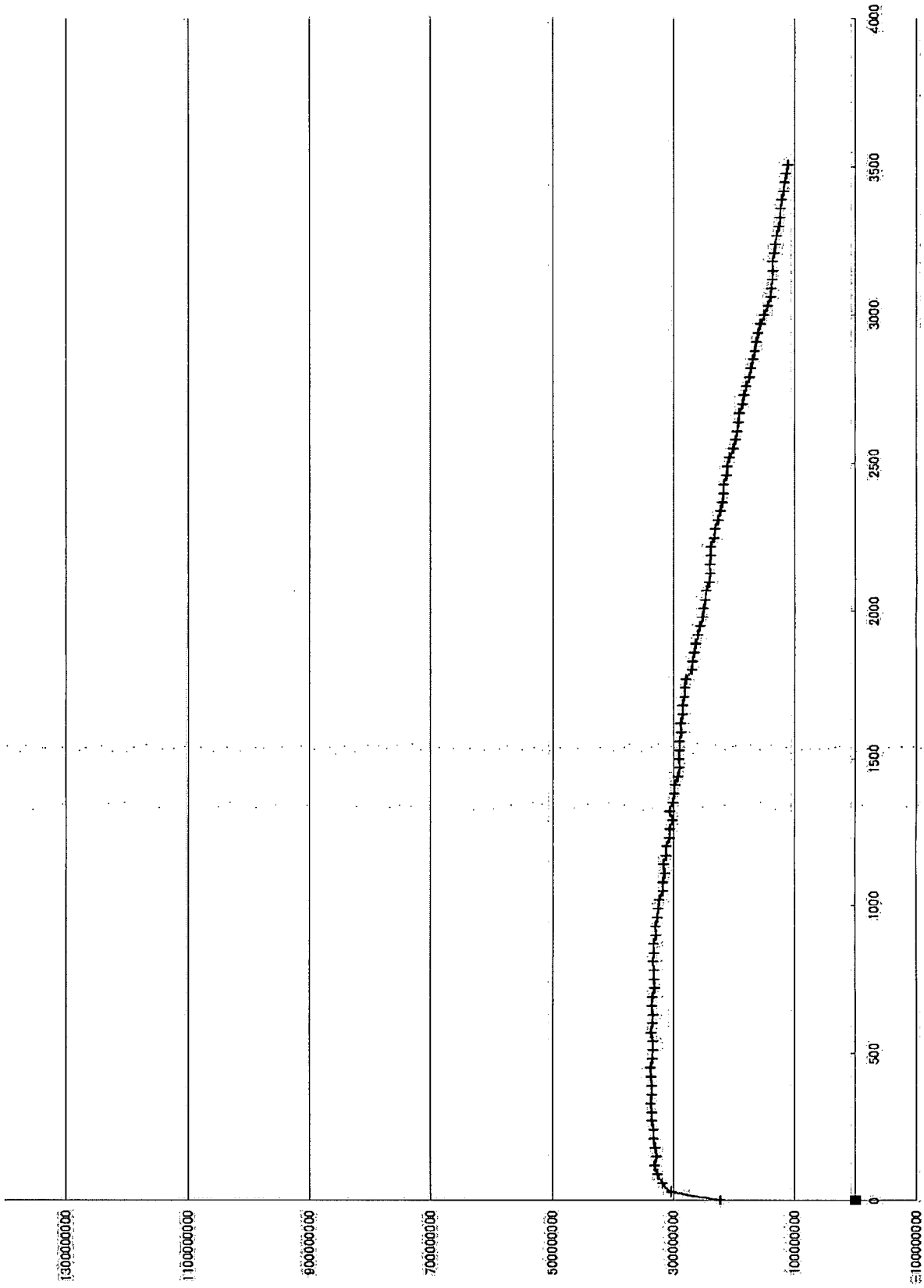
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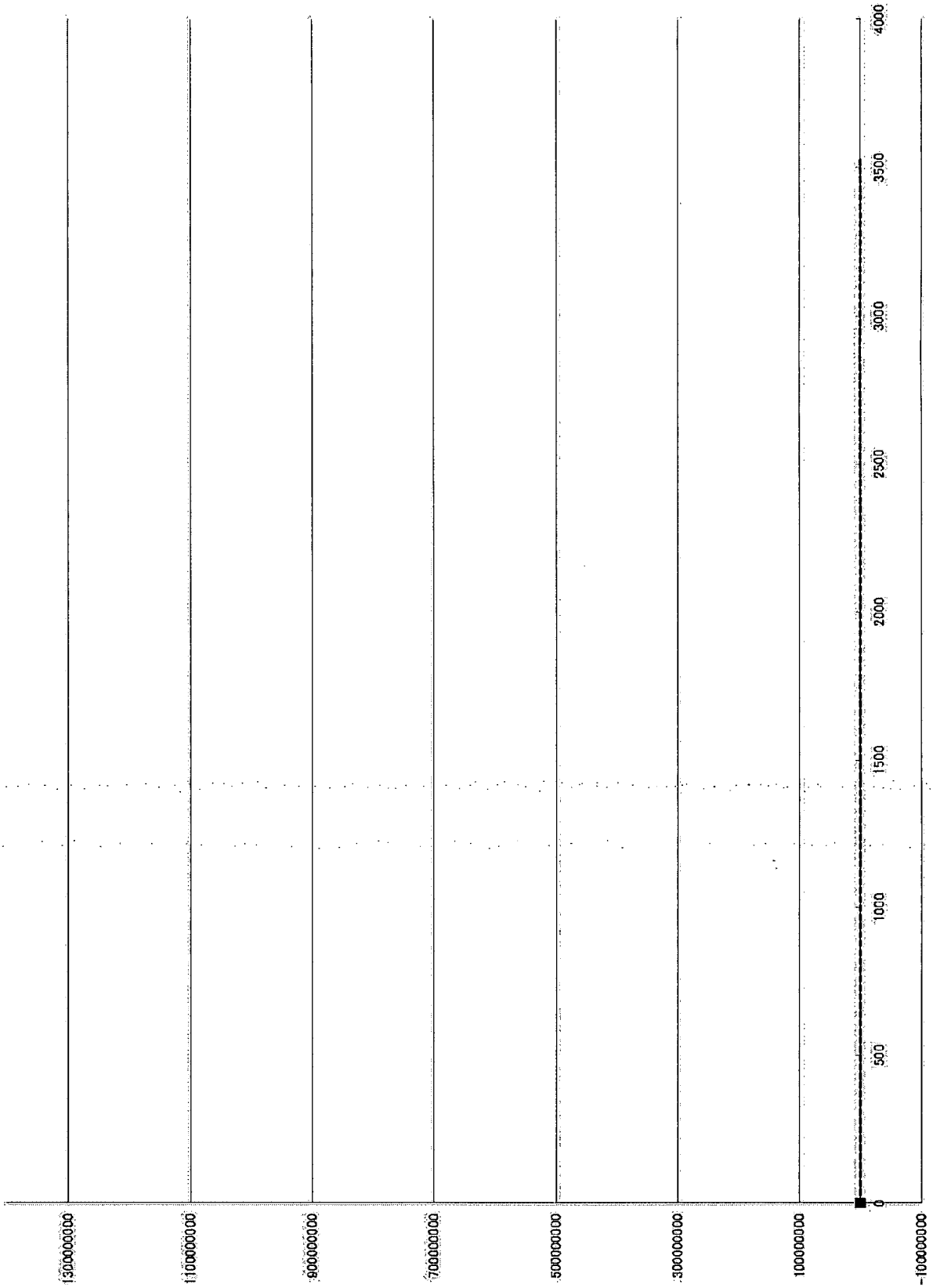
Fig. 39-16

Fig. 39-17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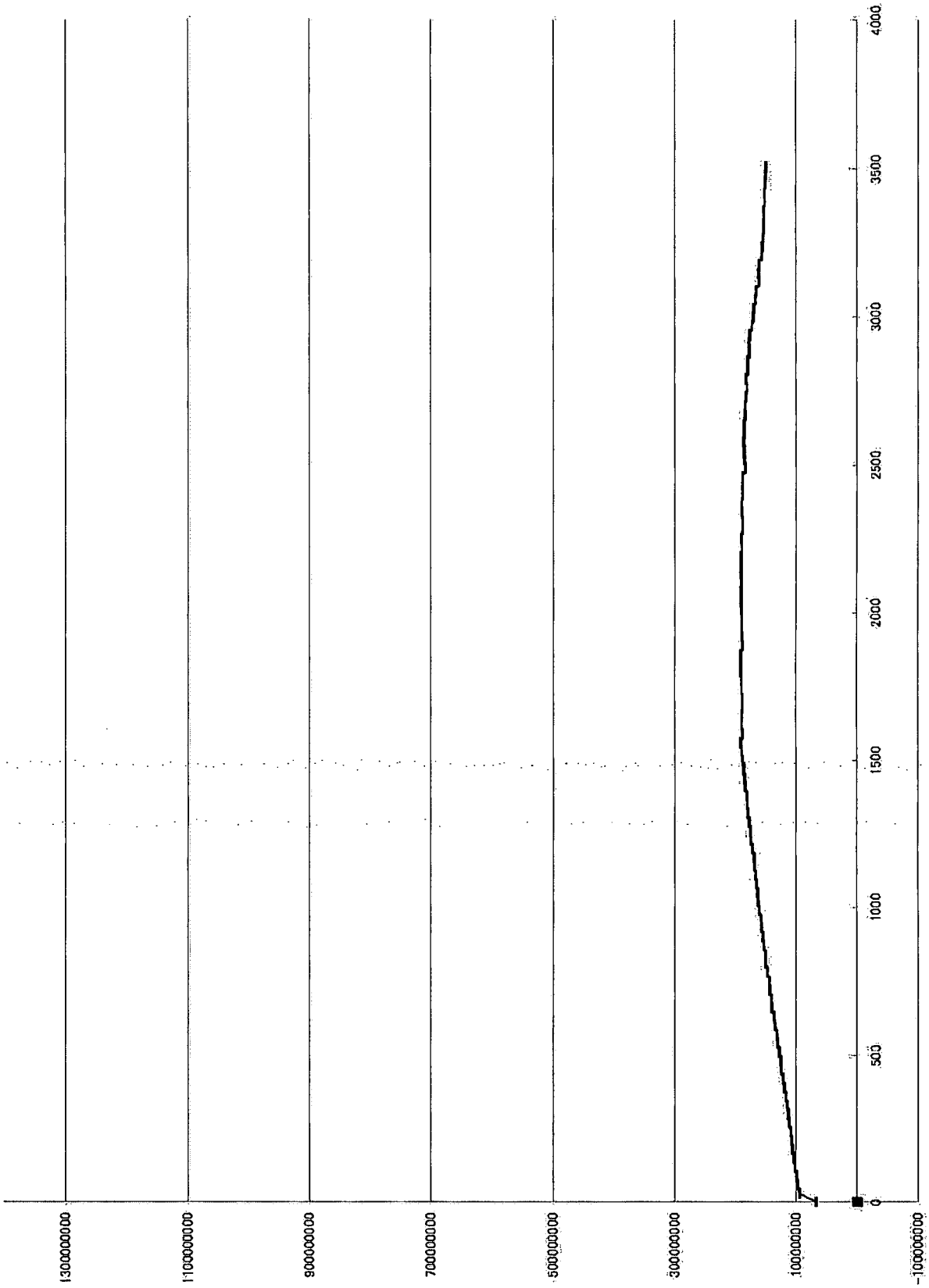
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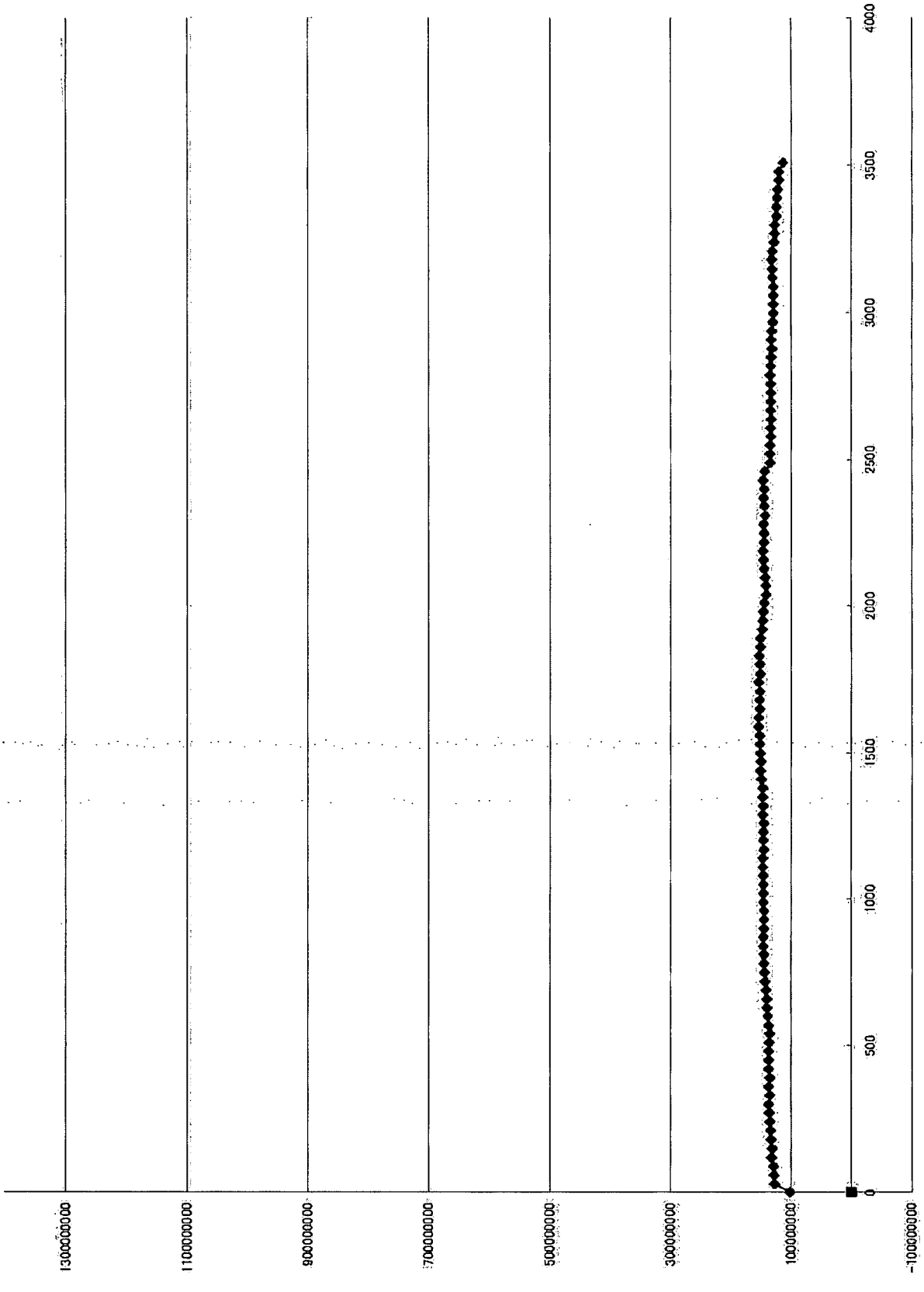
Fig. 39-18

Fig. 39-19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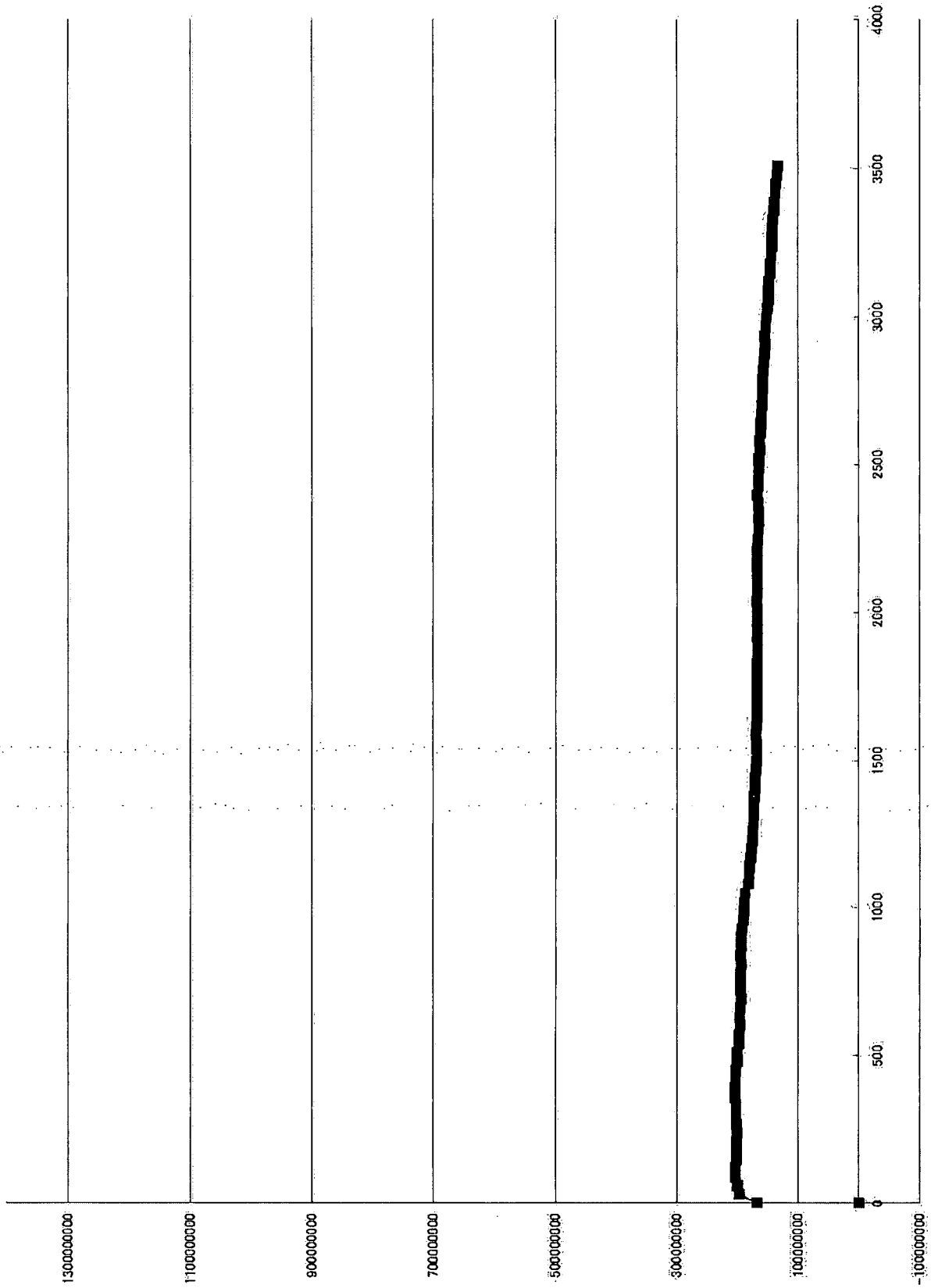
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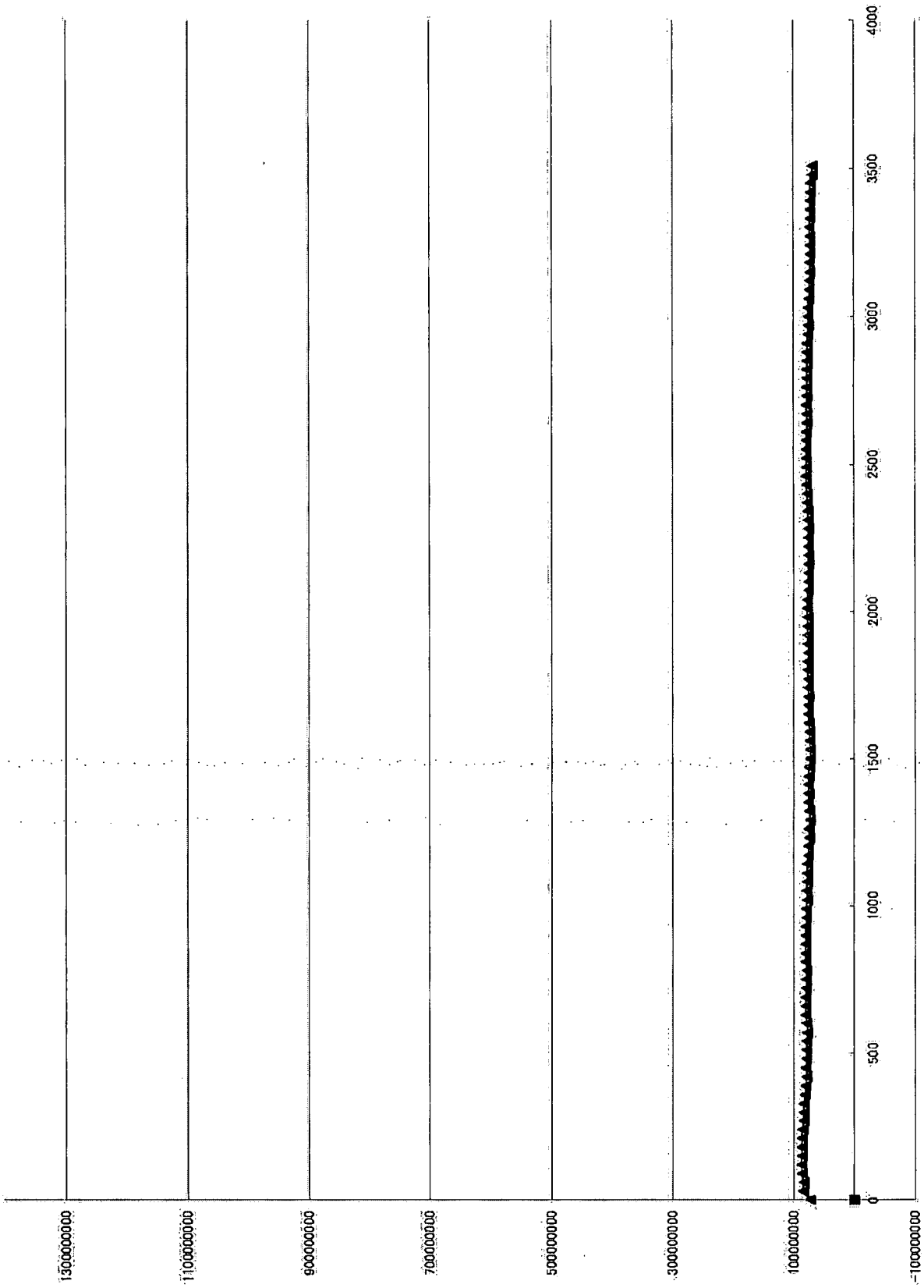
Fig. 39-20

Fig. 39-21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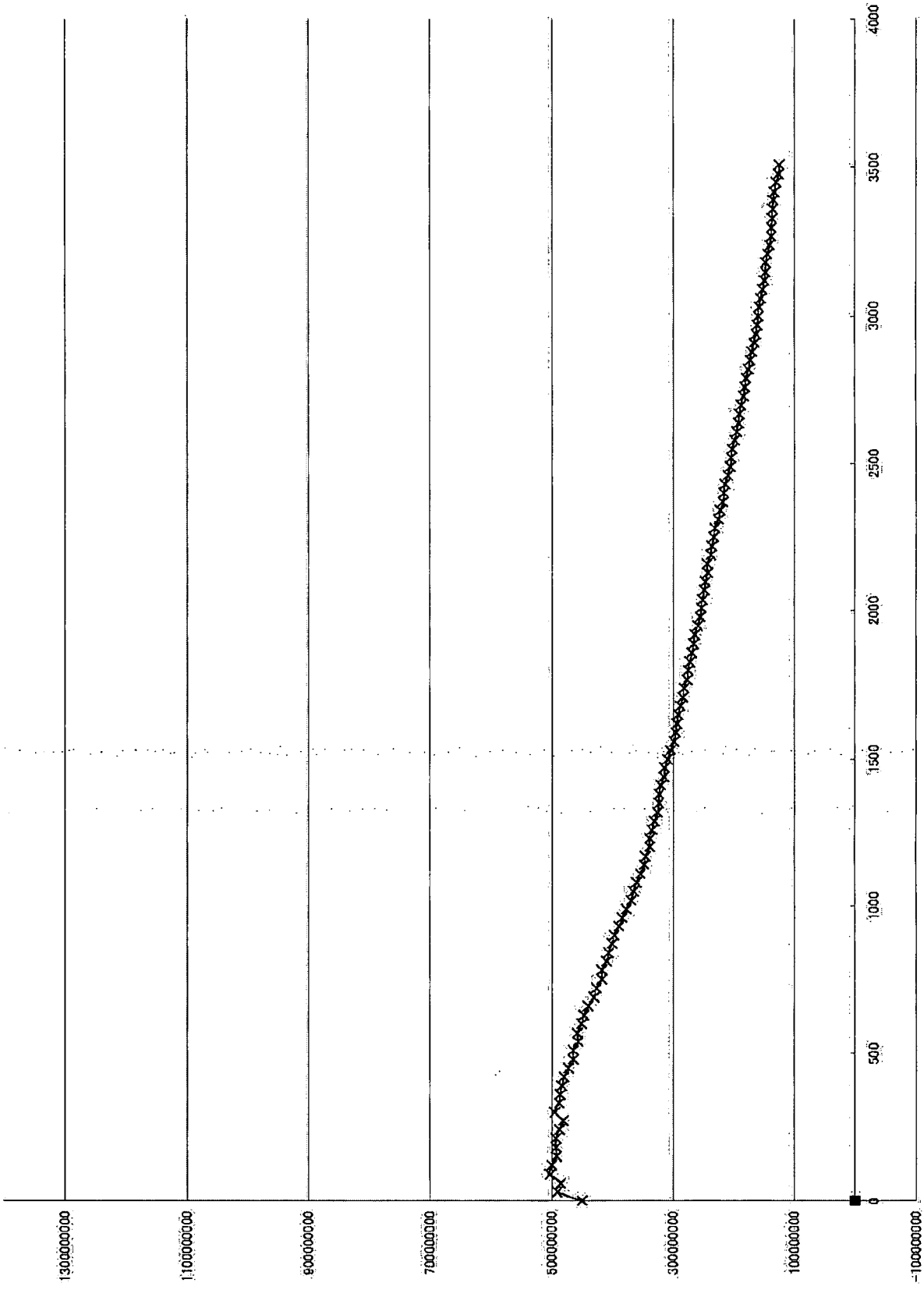
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Fig. 39-22

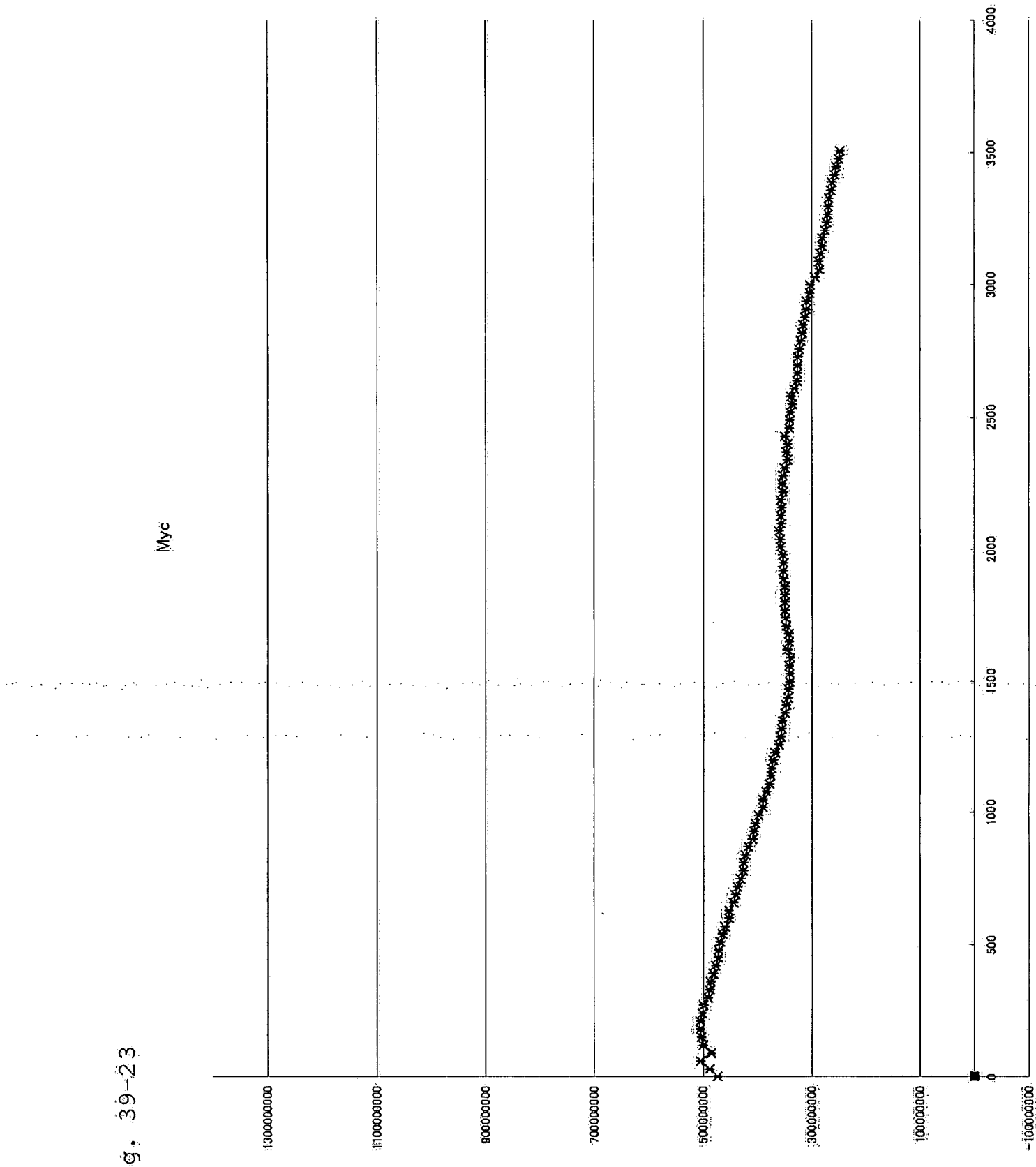
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Fig. 39-23

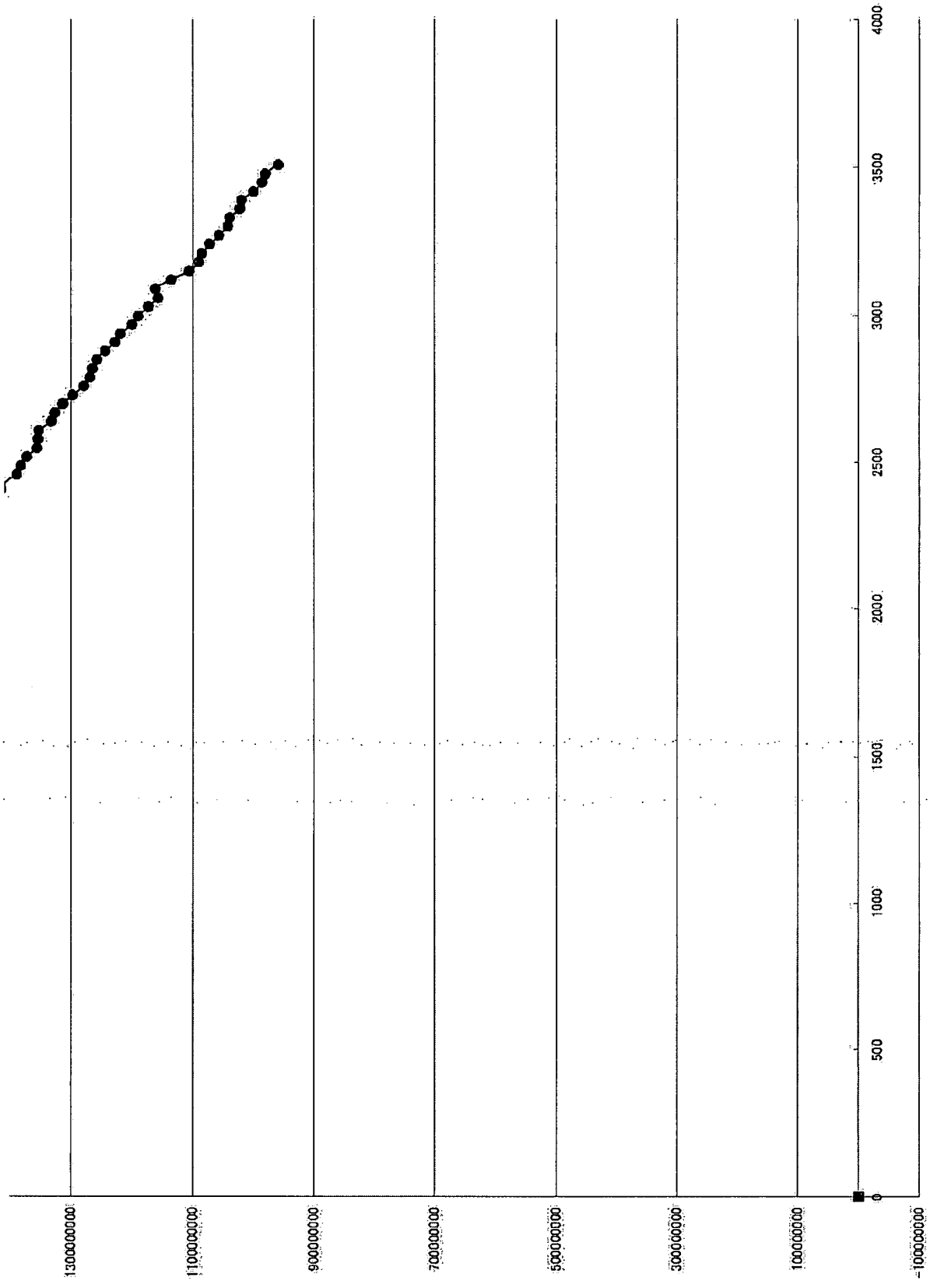
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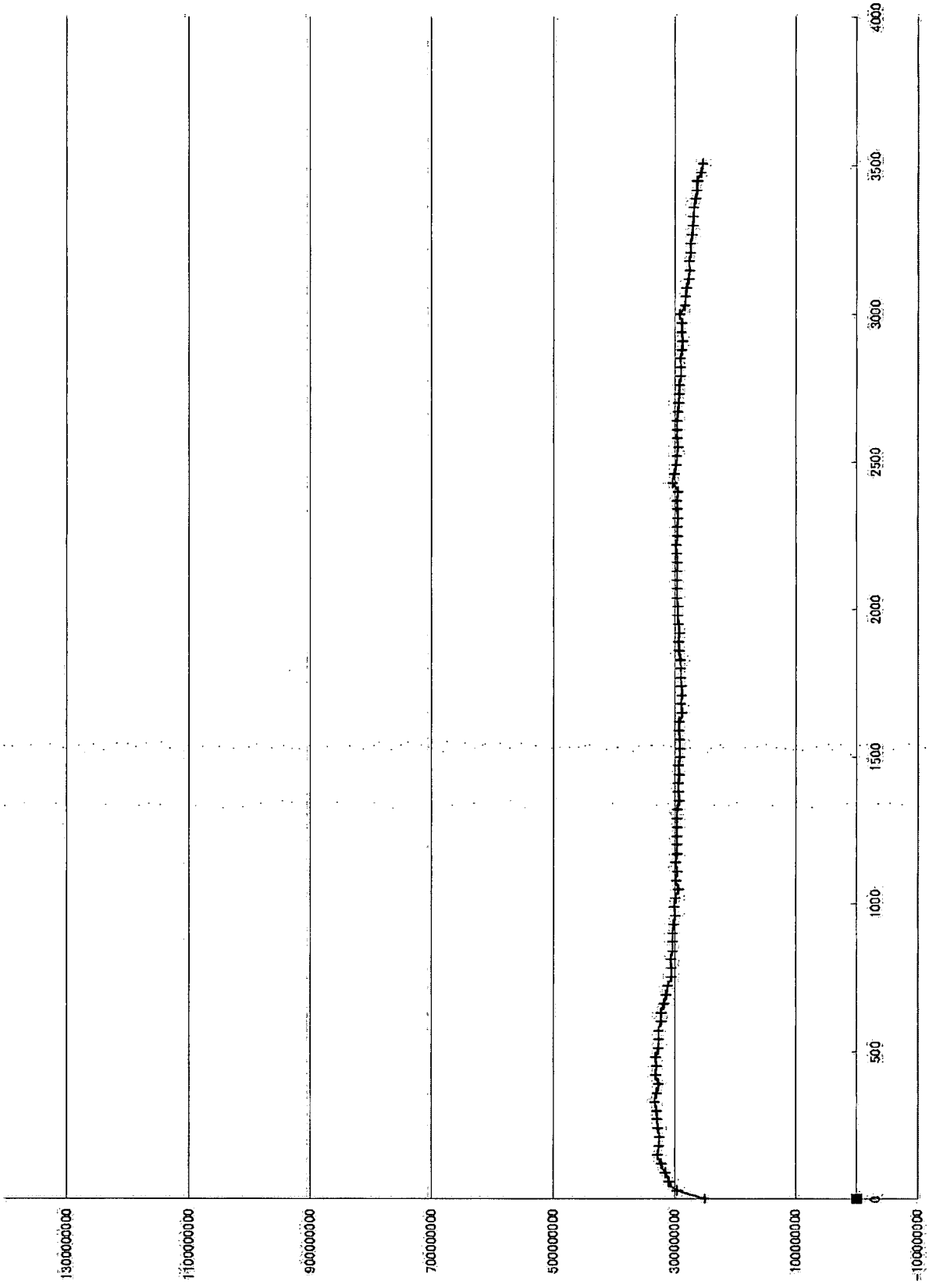
Fig. 39-24

Fig. 39-25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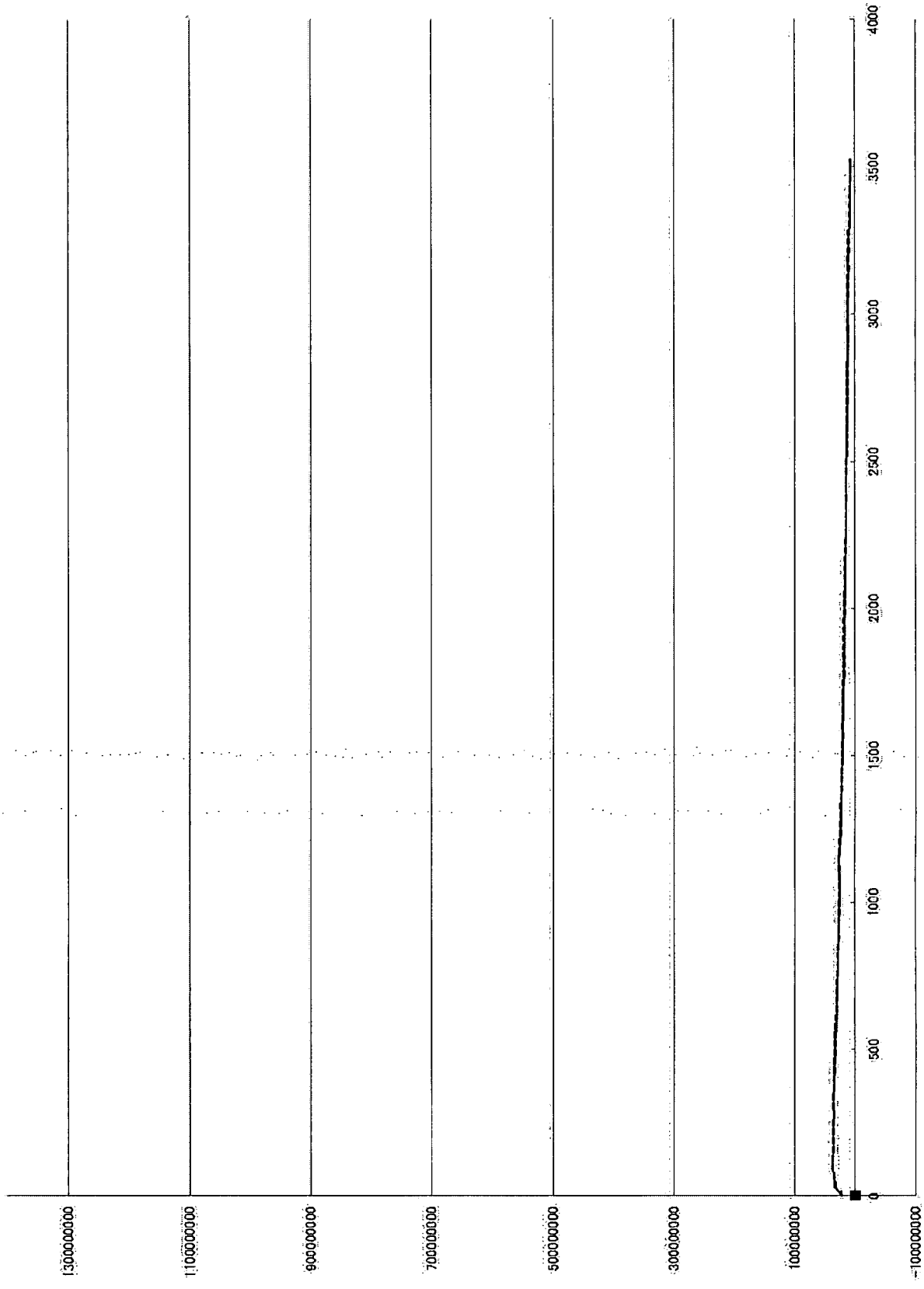
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Fig. 39-26

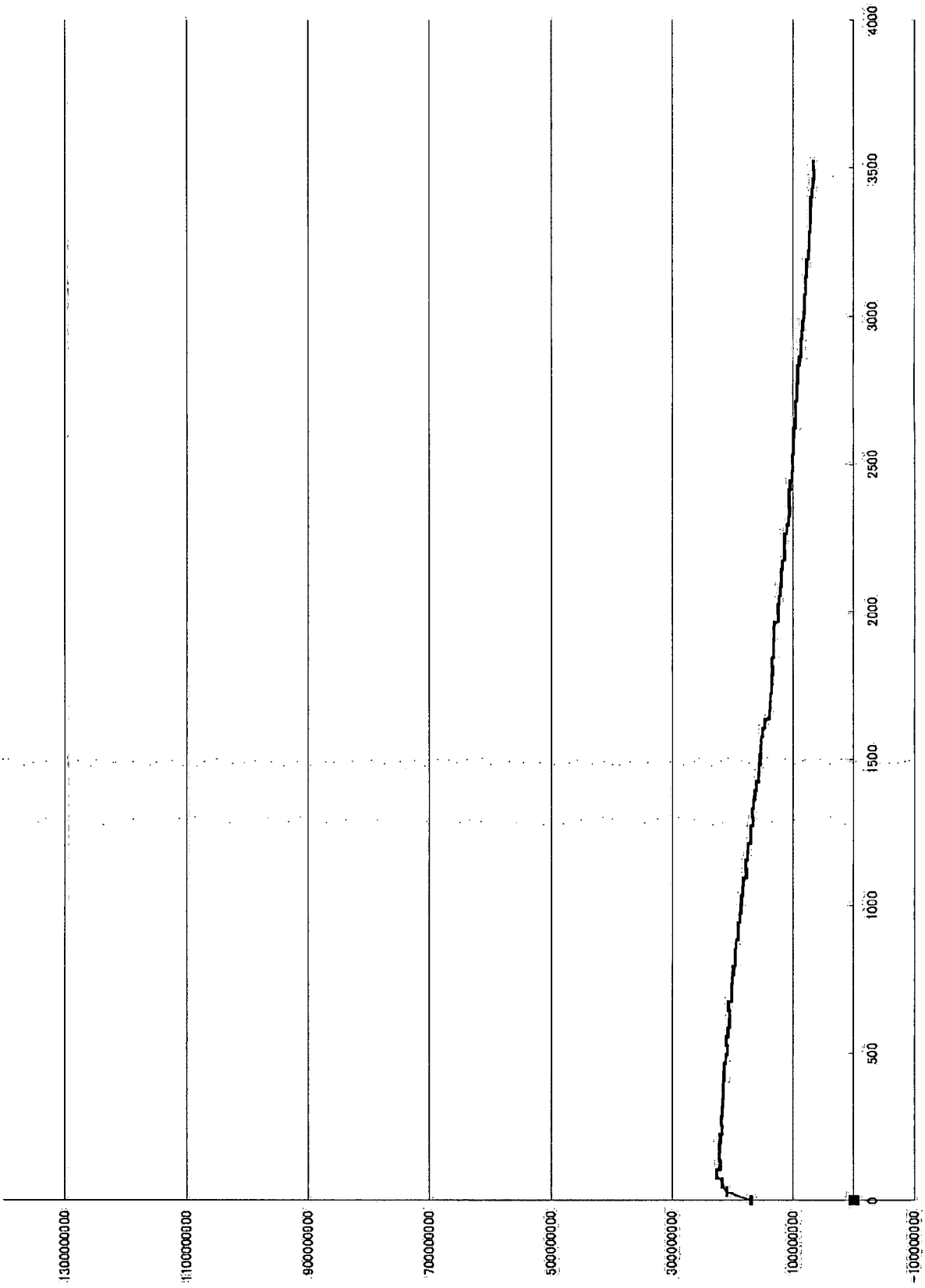
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Fig. 39-27

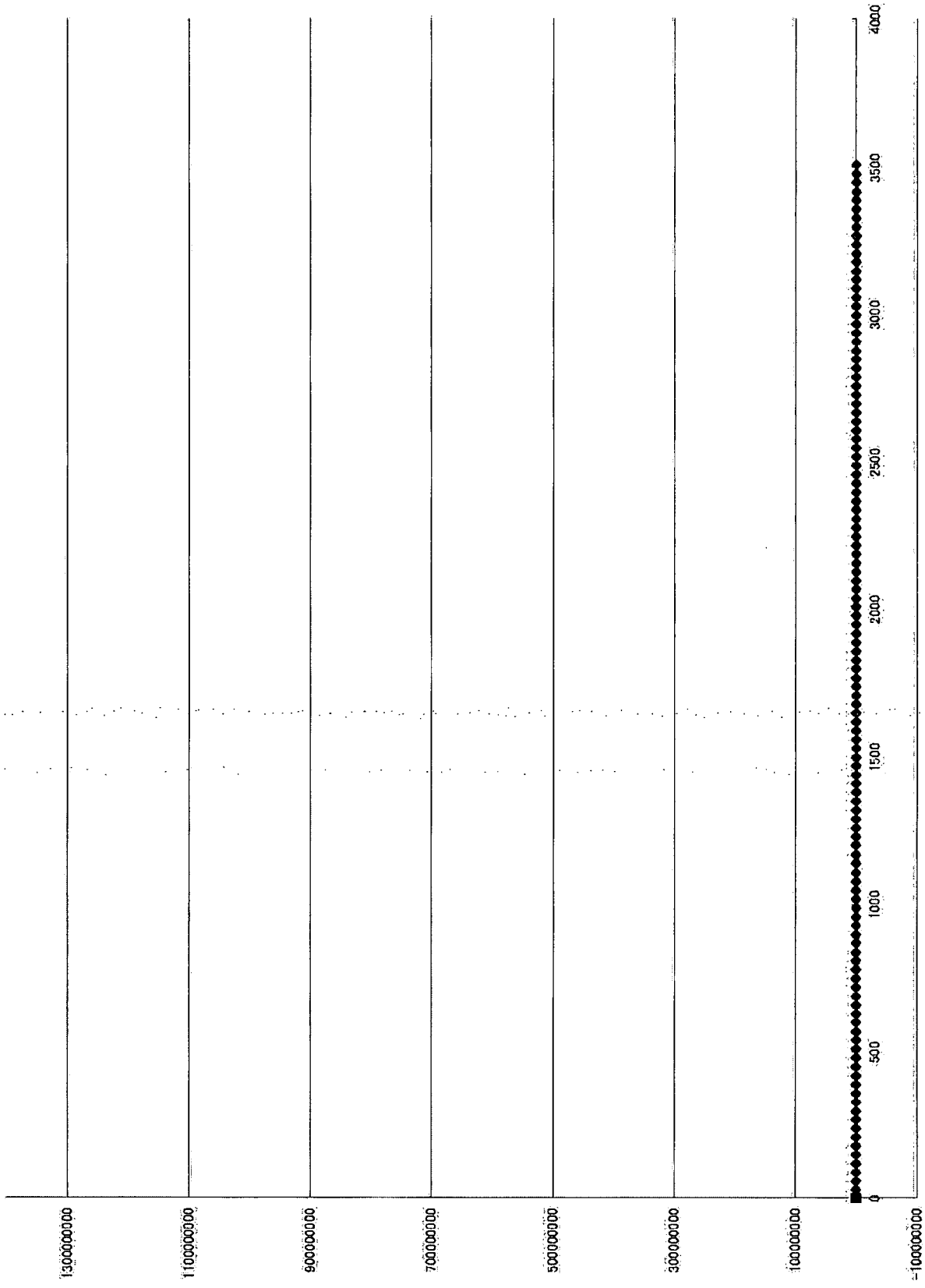
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Fig. 39-28

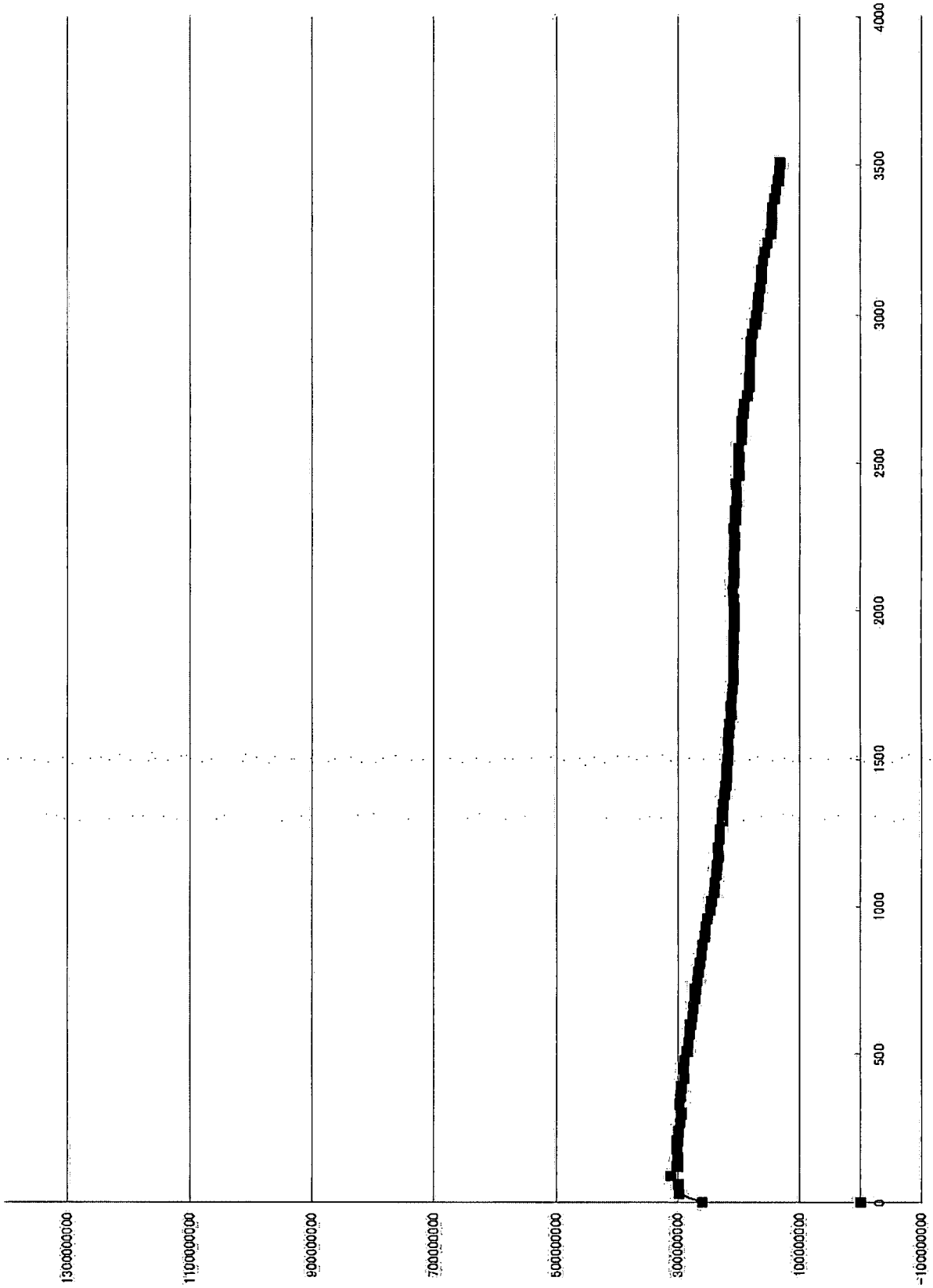
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Fig. 39-29

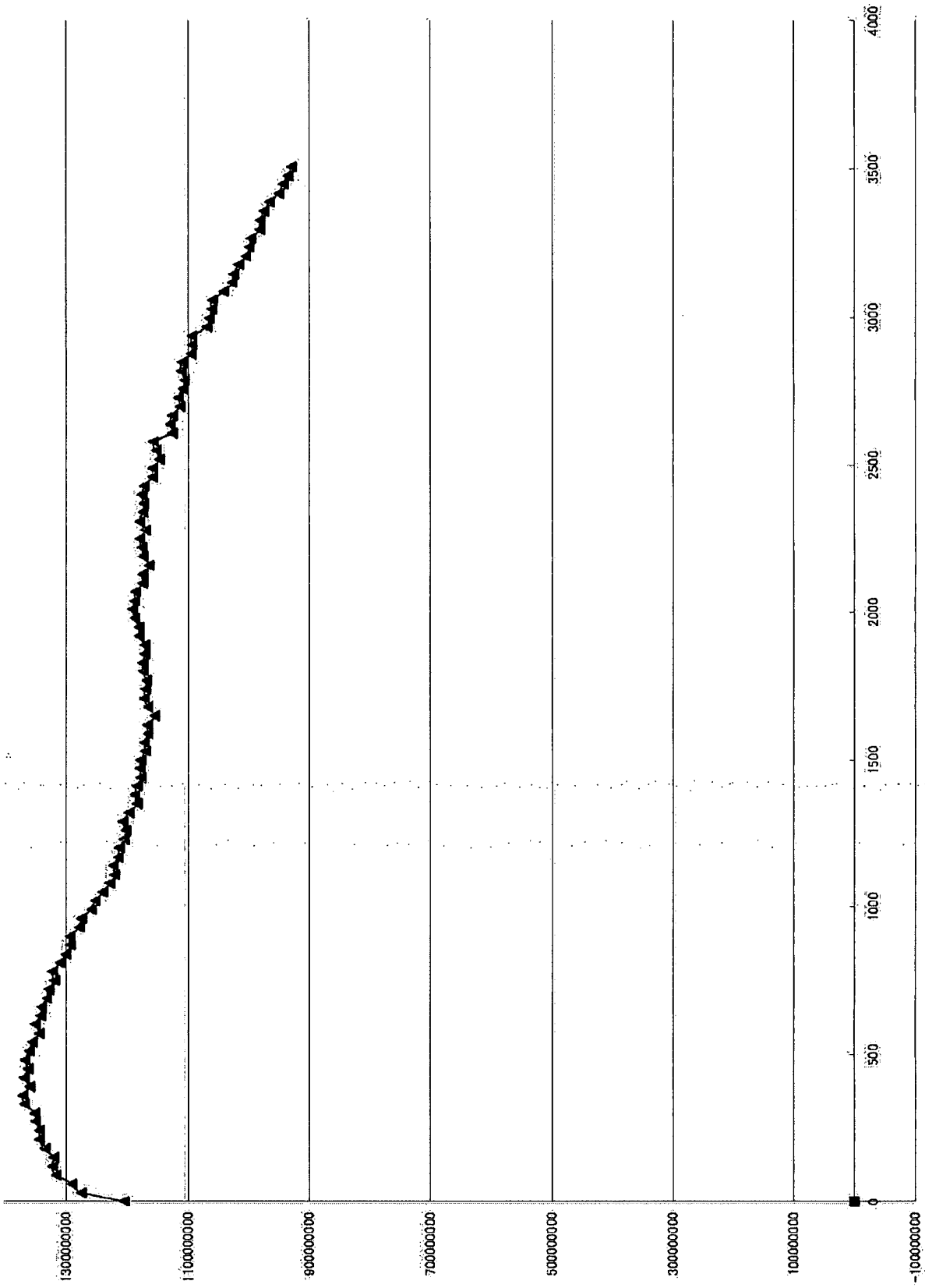
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Fig. 39-30

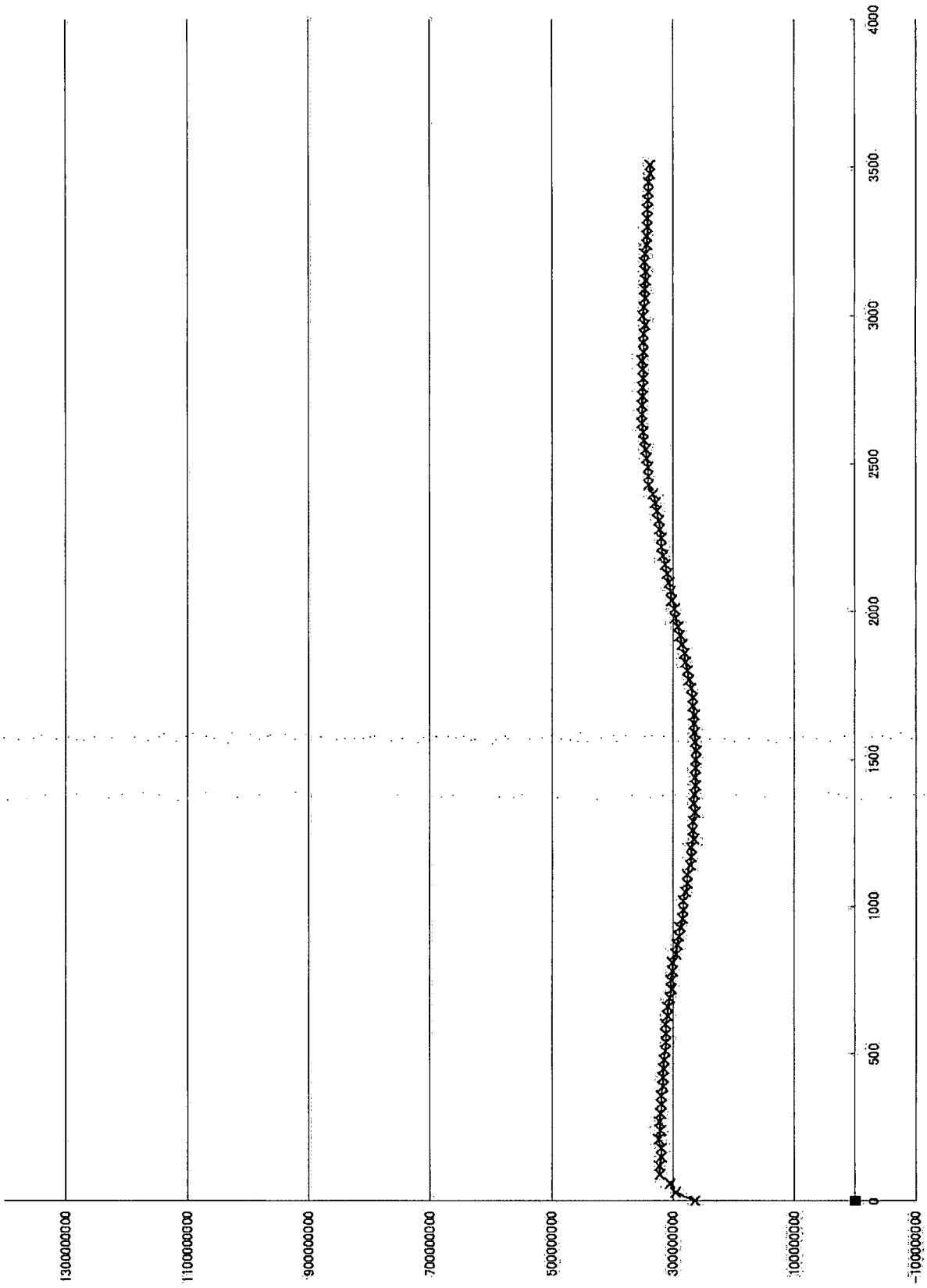
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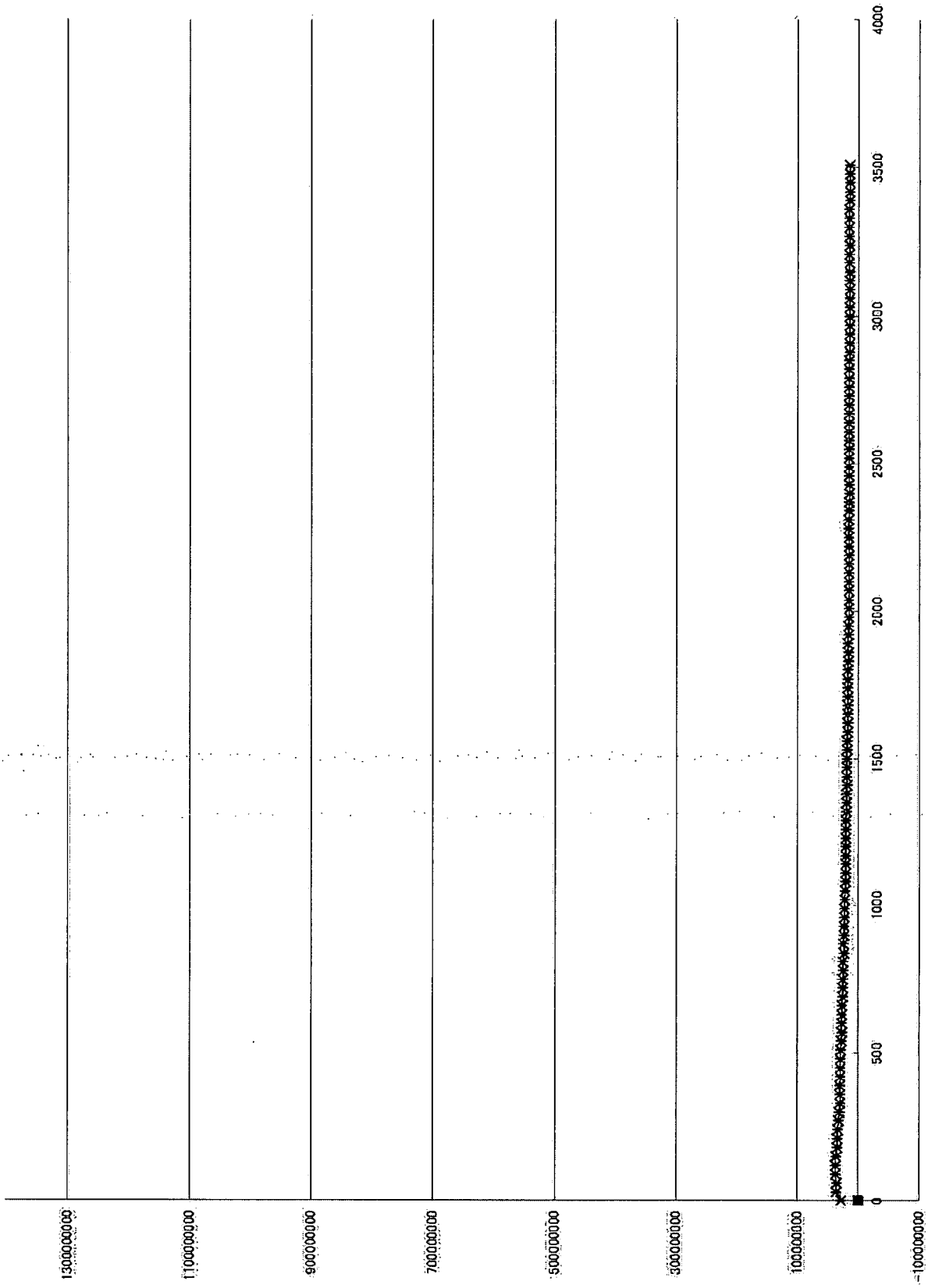
Fig. 39-31

Fig. 39-32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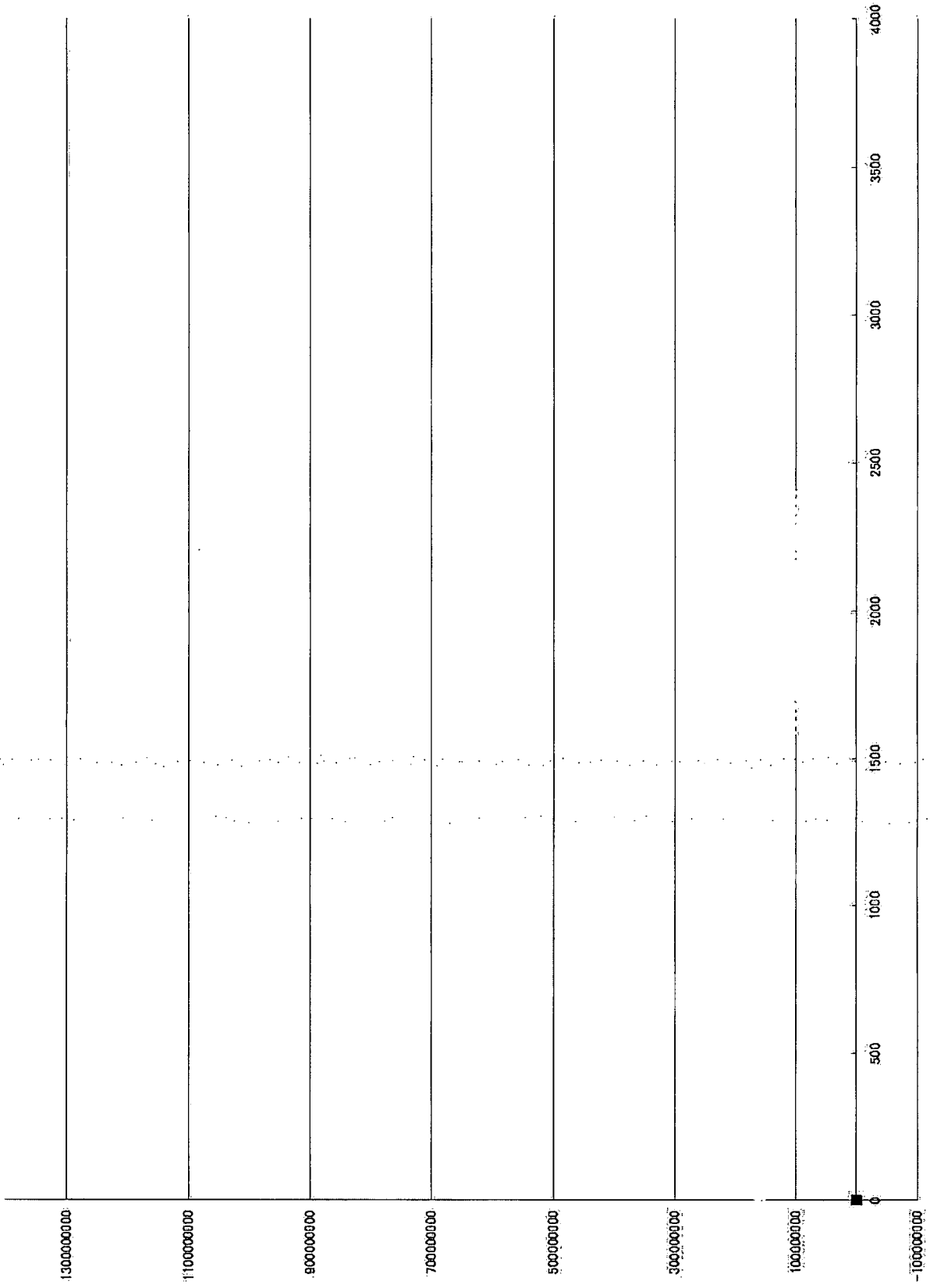
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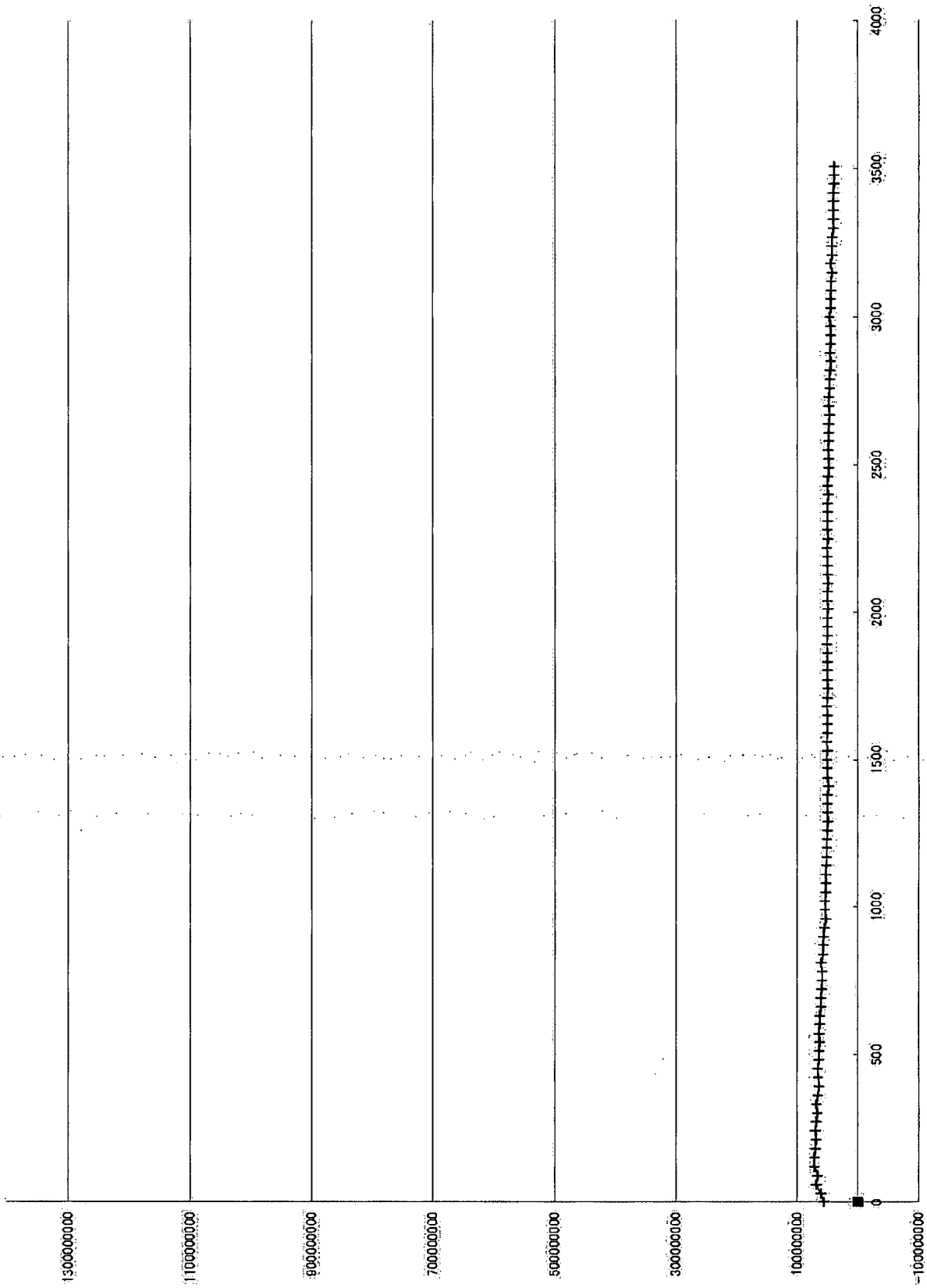
Fig. 39-33

Fig. 39-34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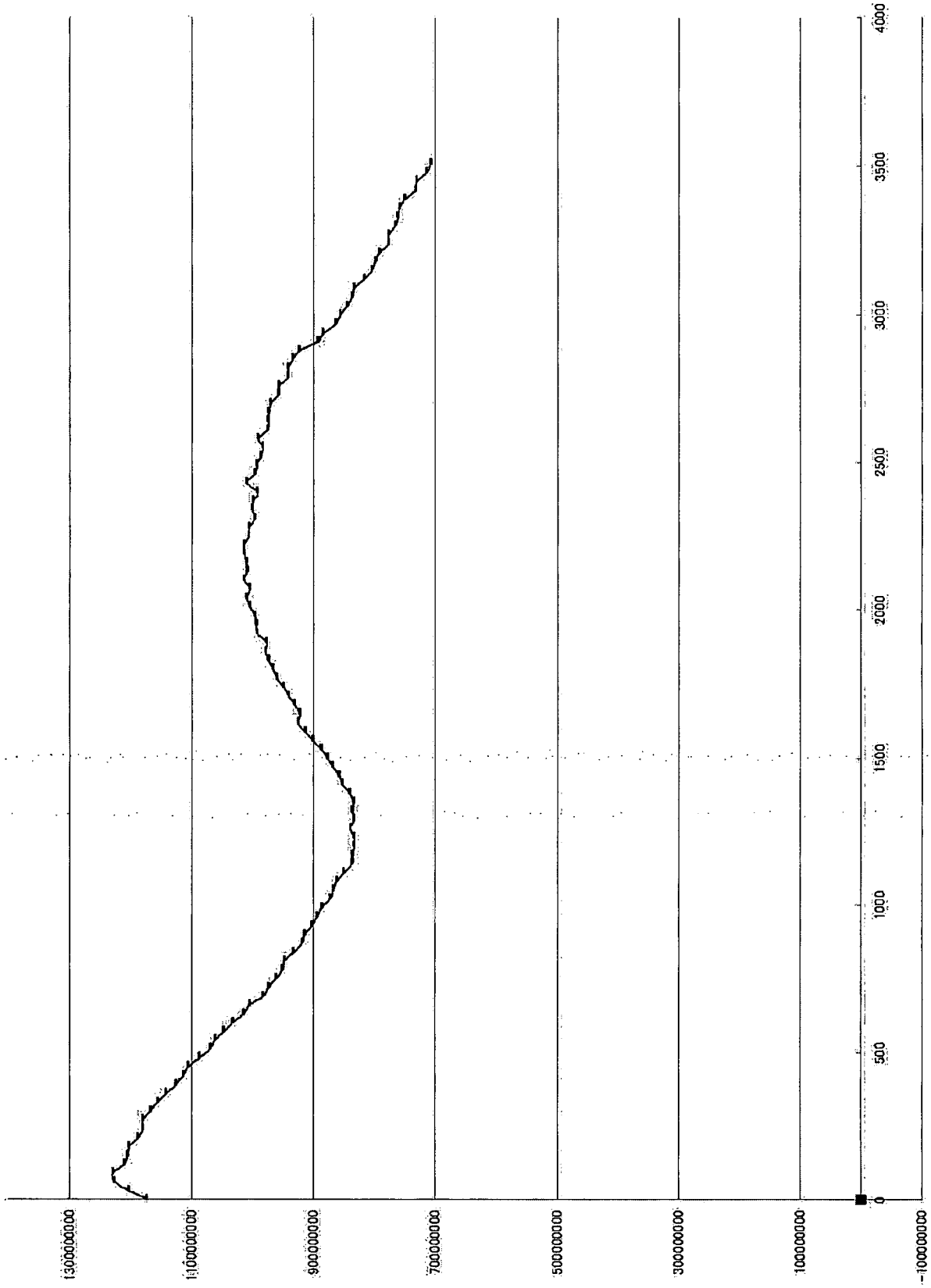
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Fig. 39-35

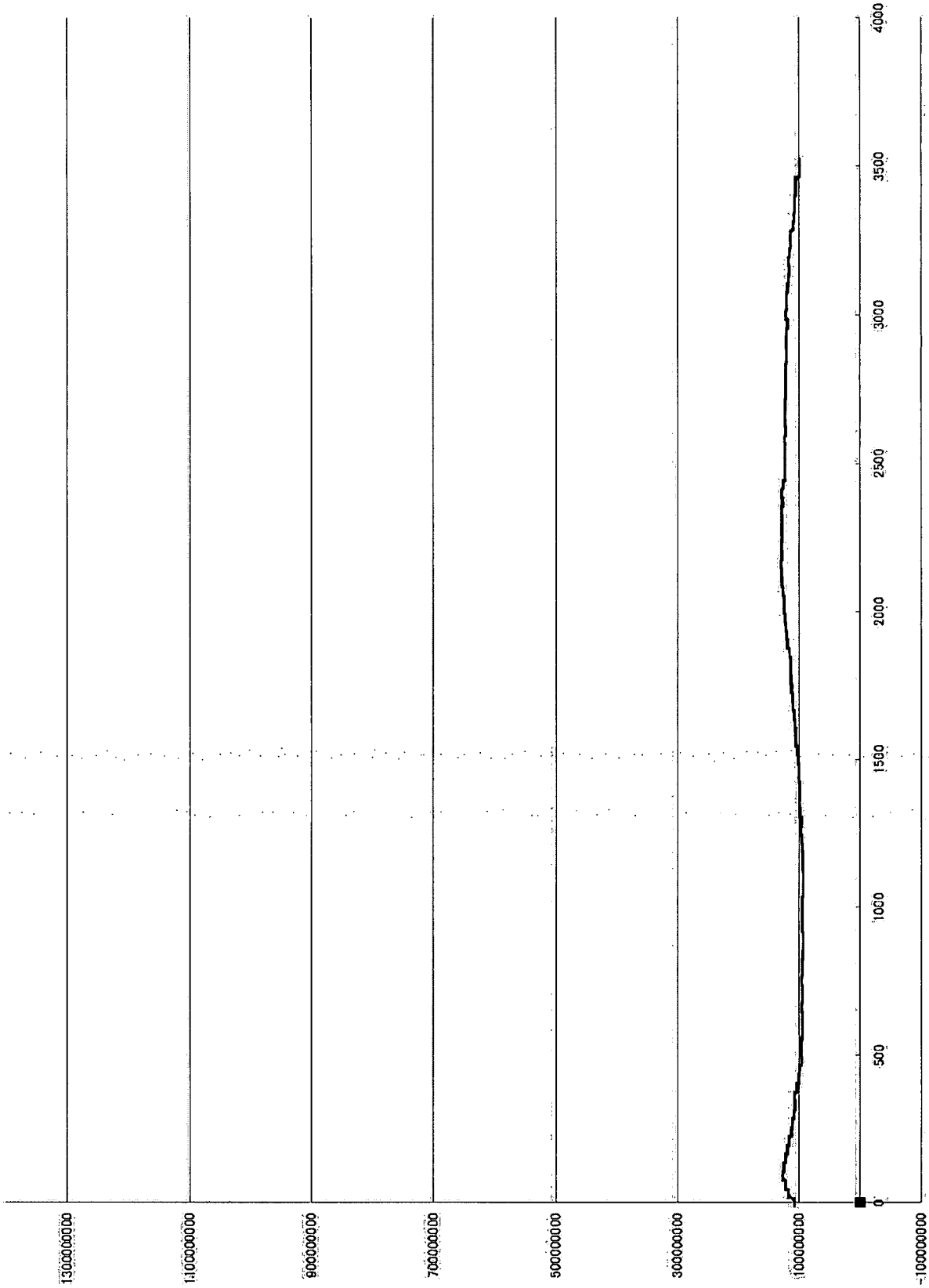
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Fig. 39-36

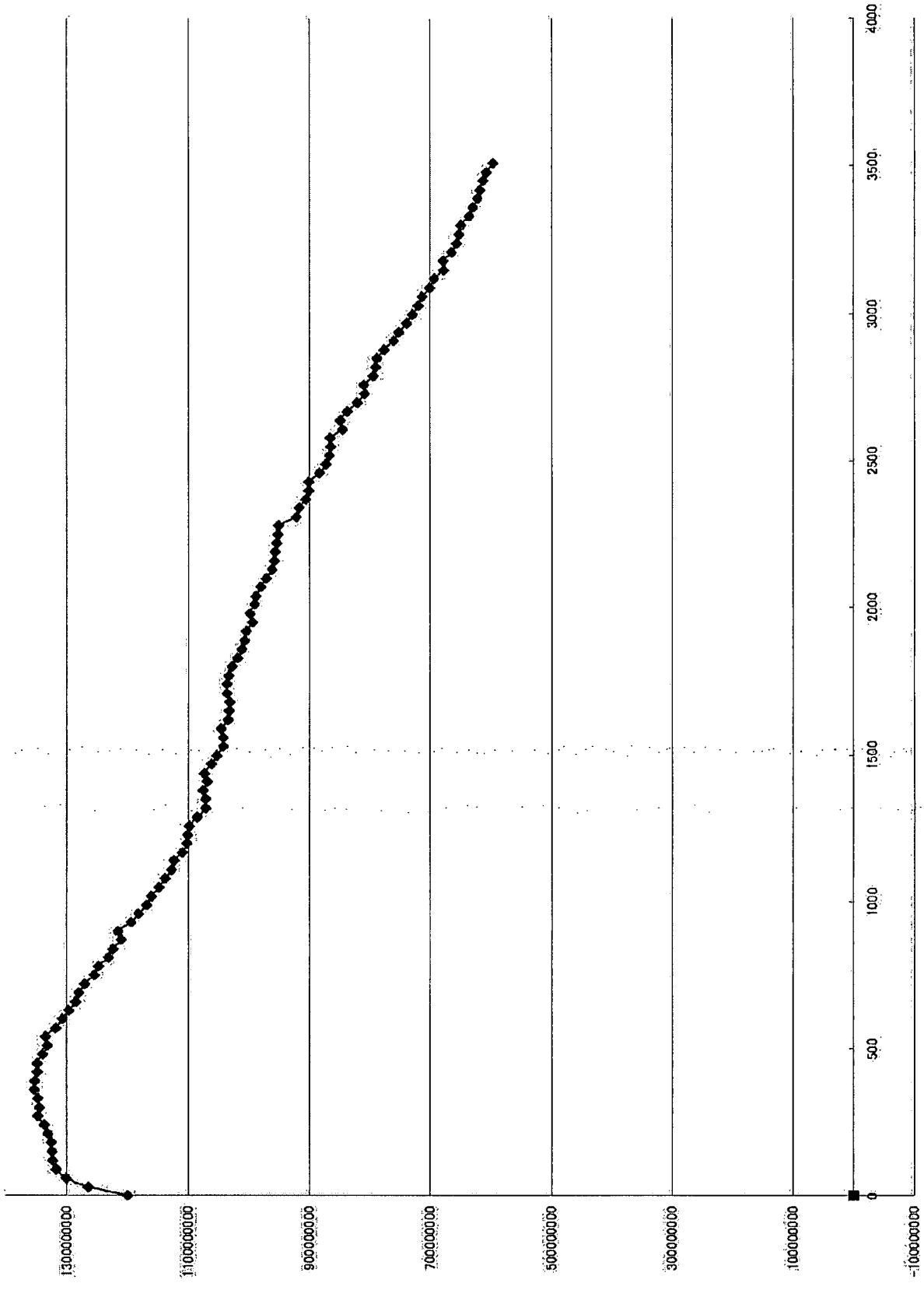
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Fig. 39-37

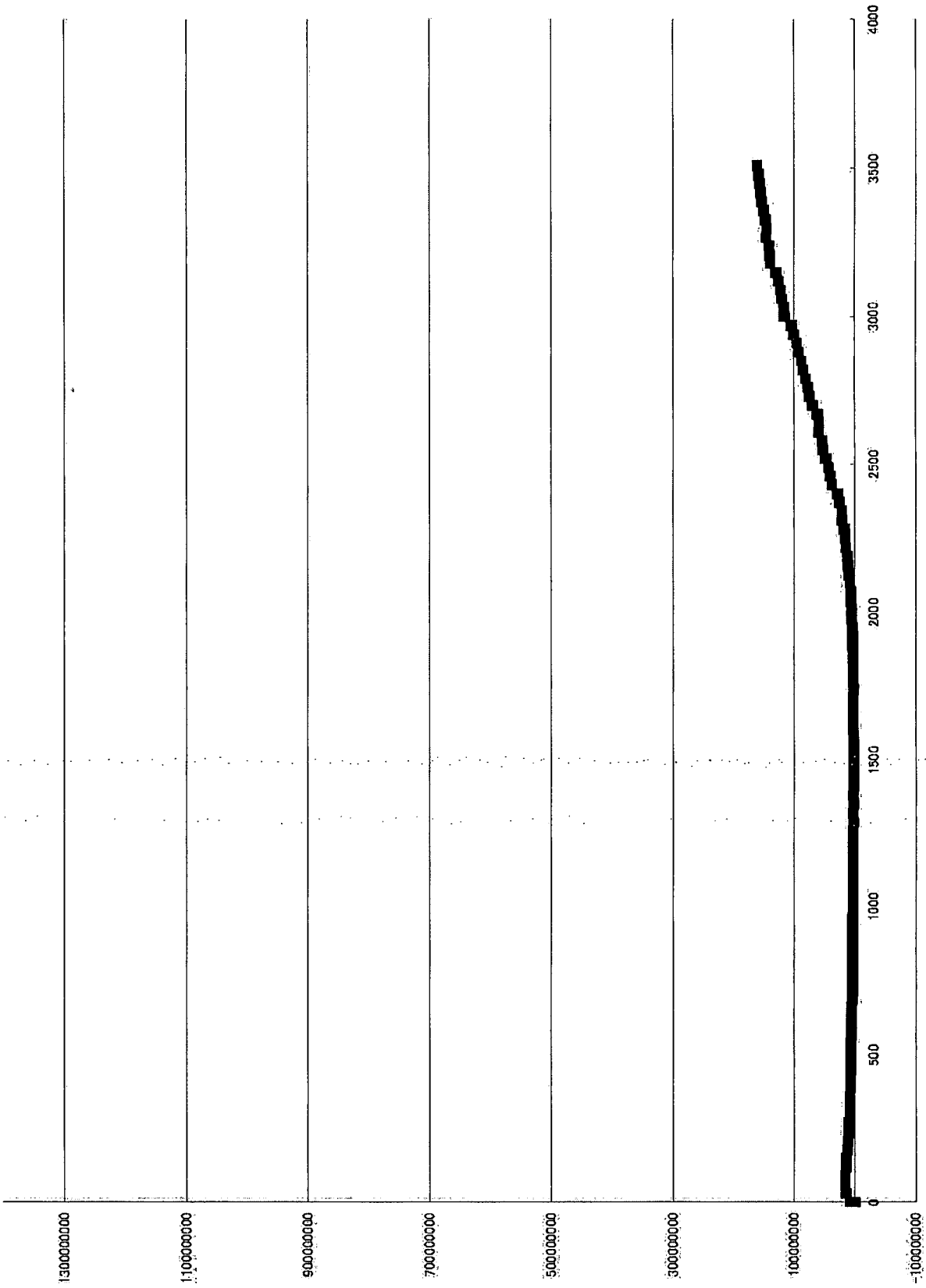
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Fig. 39-38

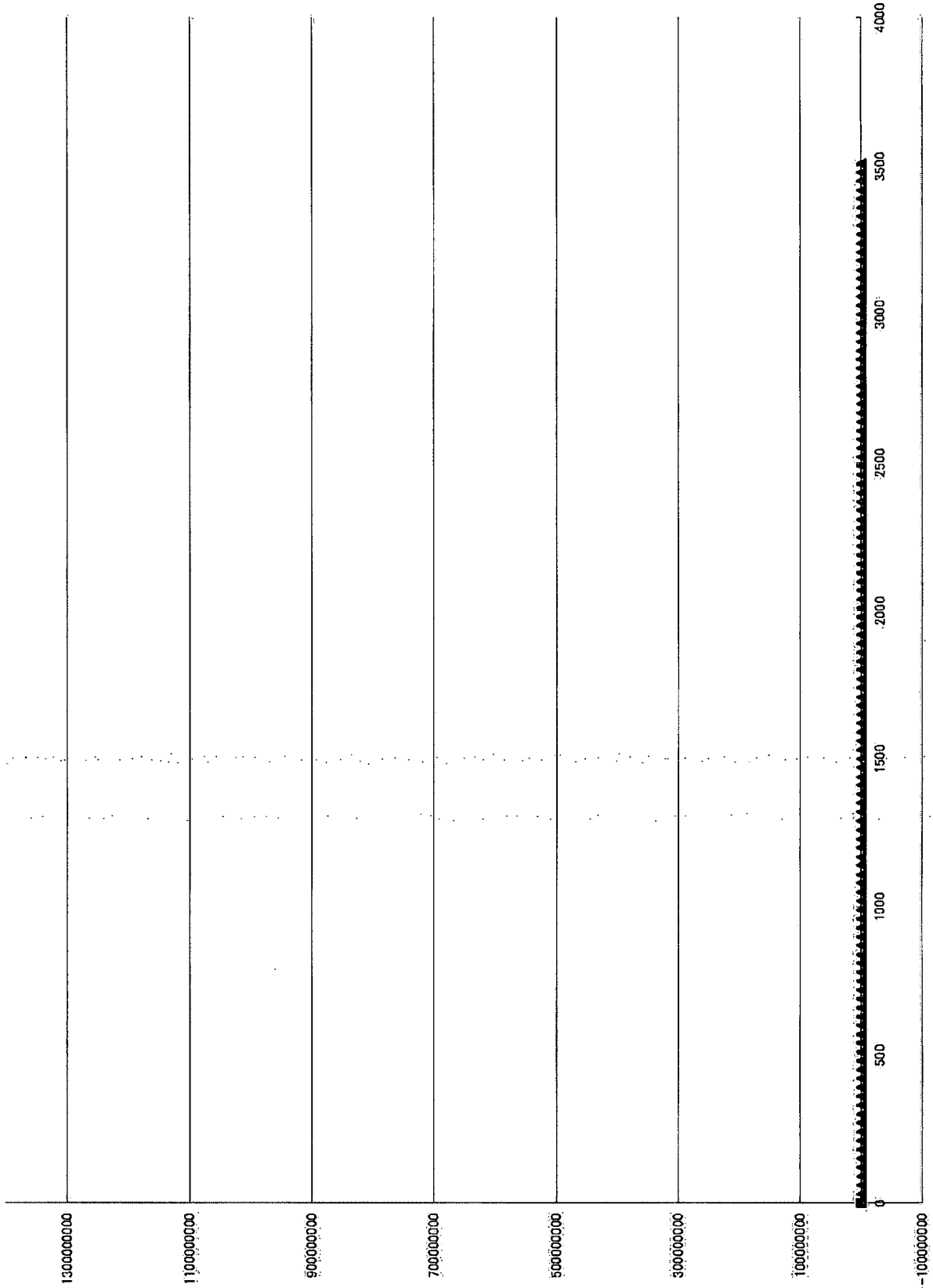
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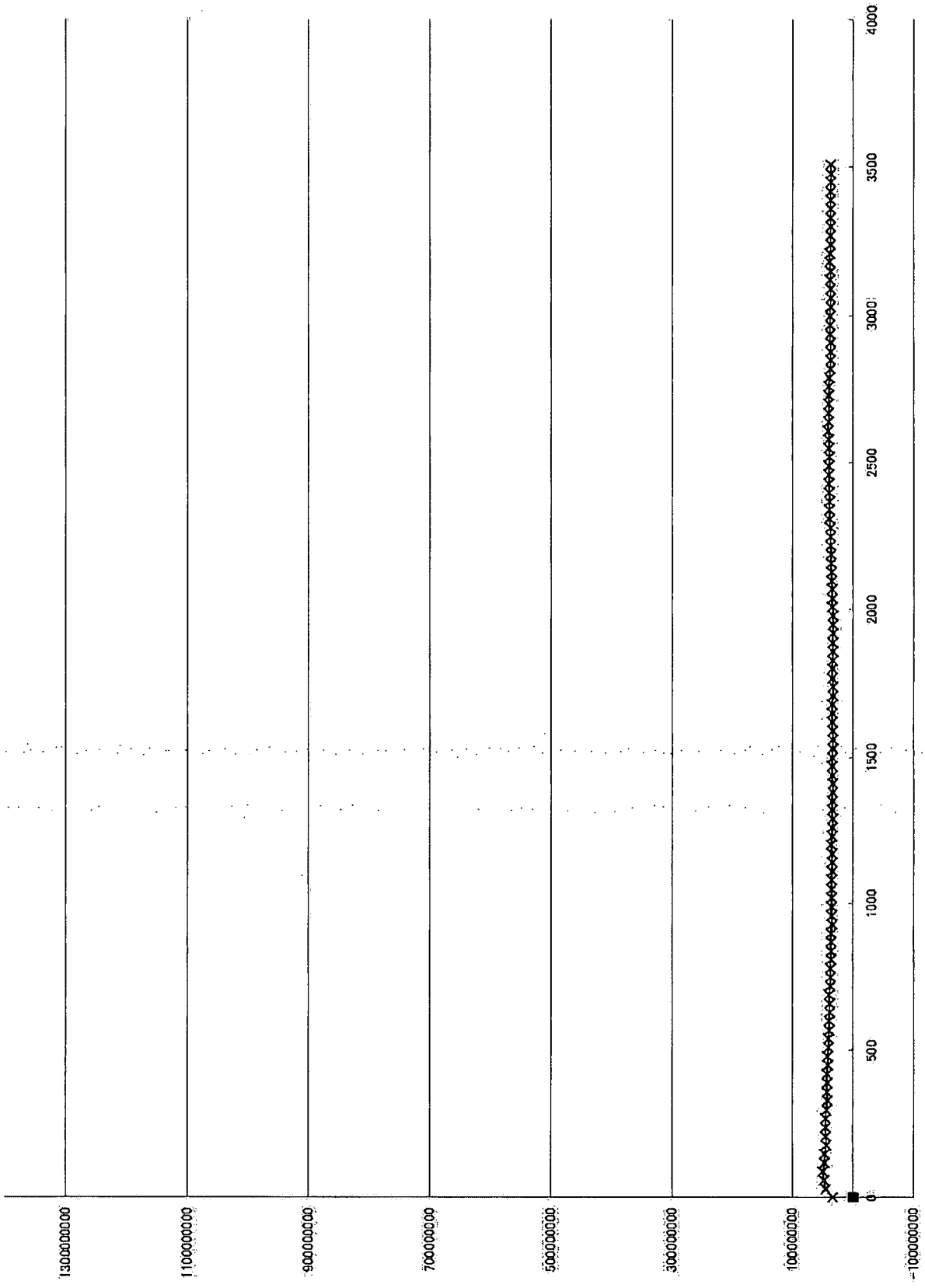
Fig. 39-39

Fig. 39-40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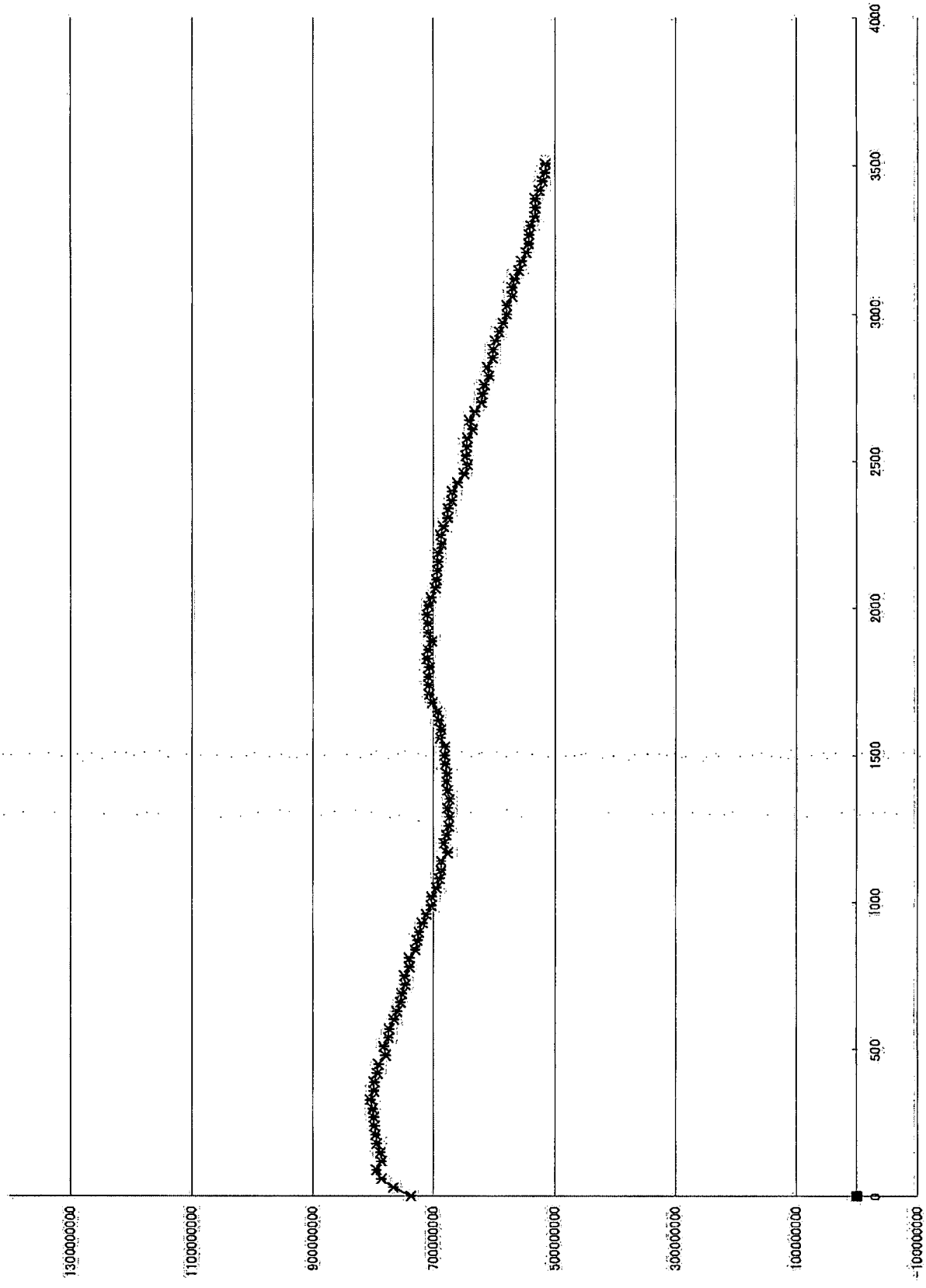
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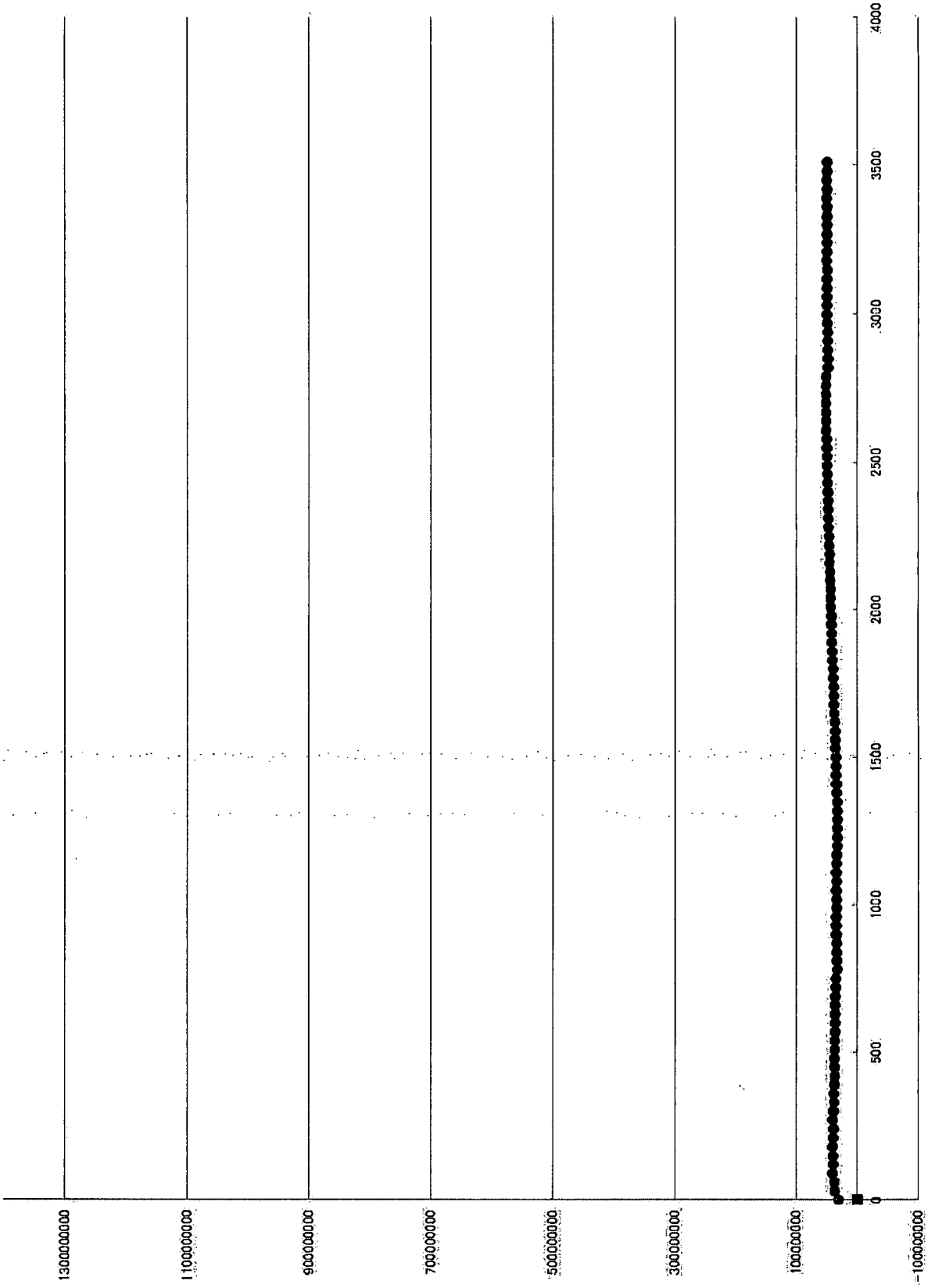
Fig. 39-41

Fig. 39-42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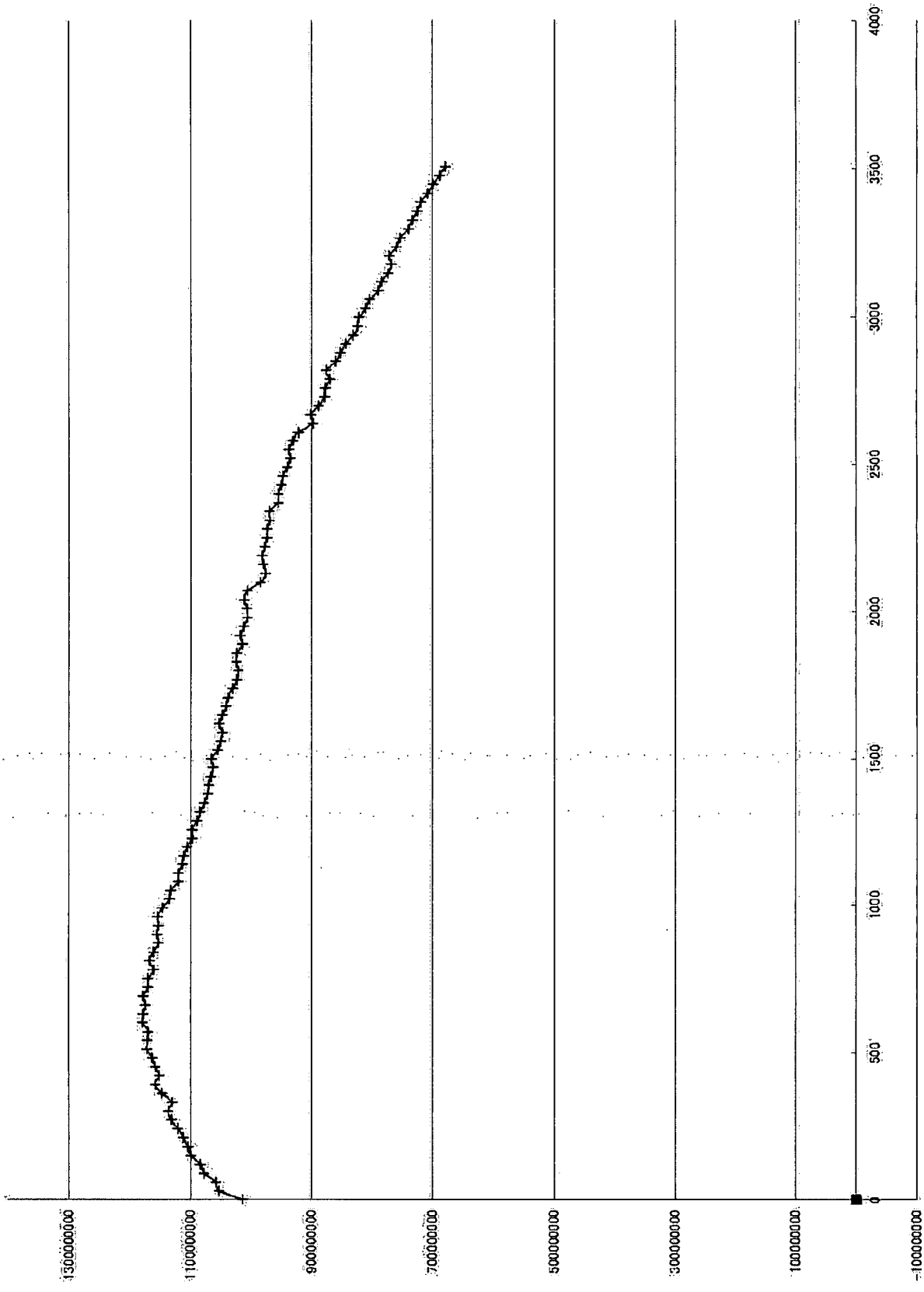
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Fig. 39-43

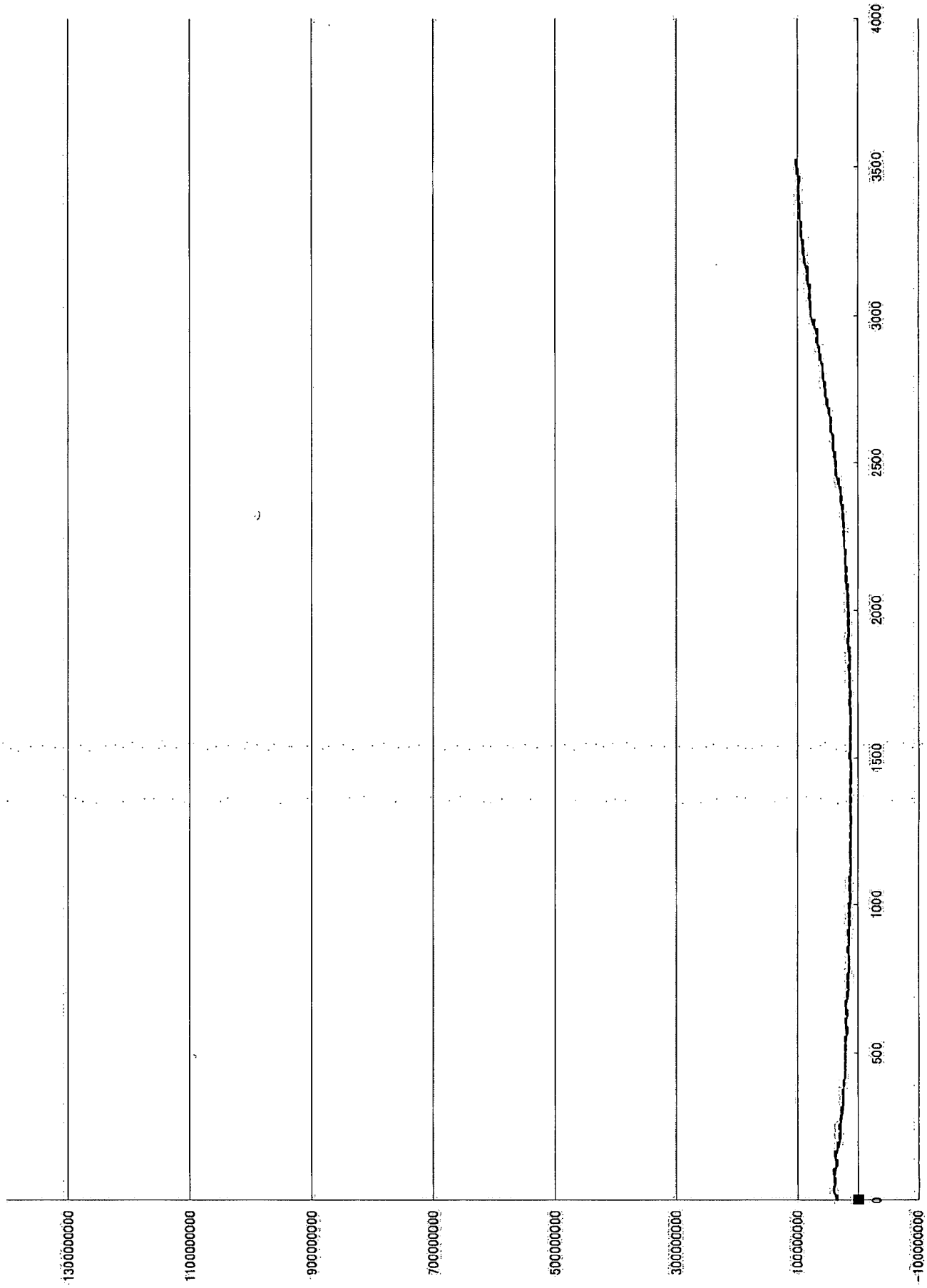
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Fig. 39-44

Fig. 39-45

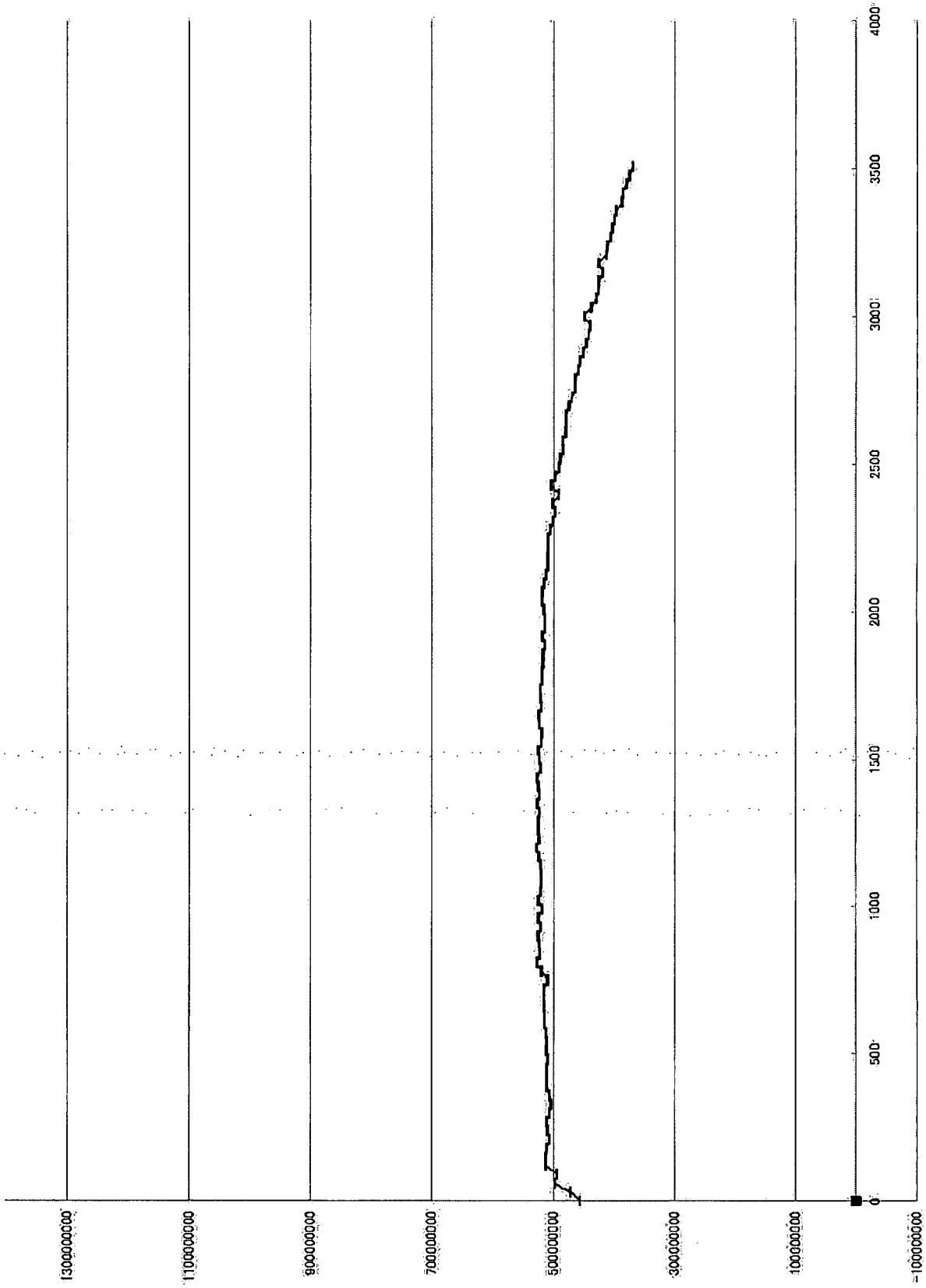
CREB-EGFP
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Fig. 39-46


IκB-EGFP
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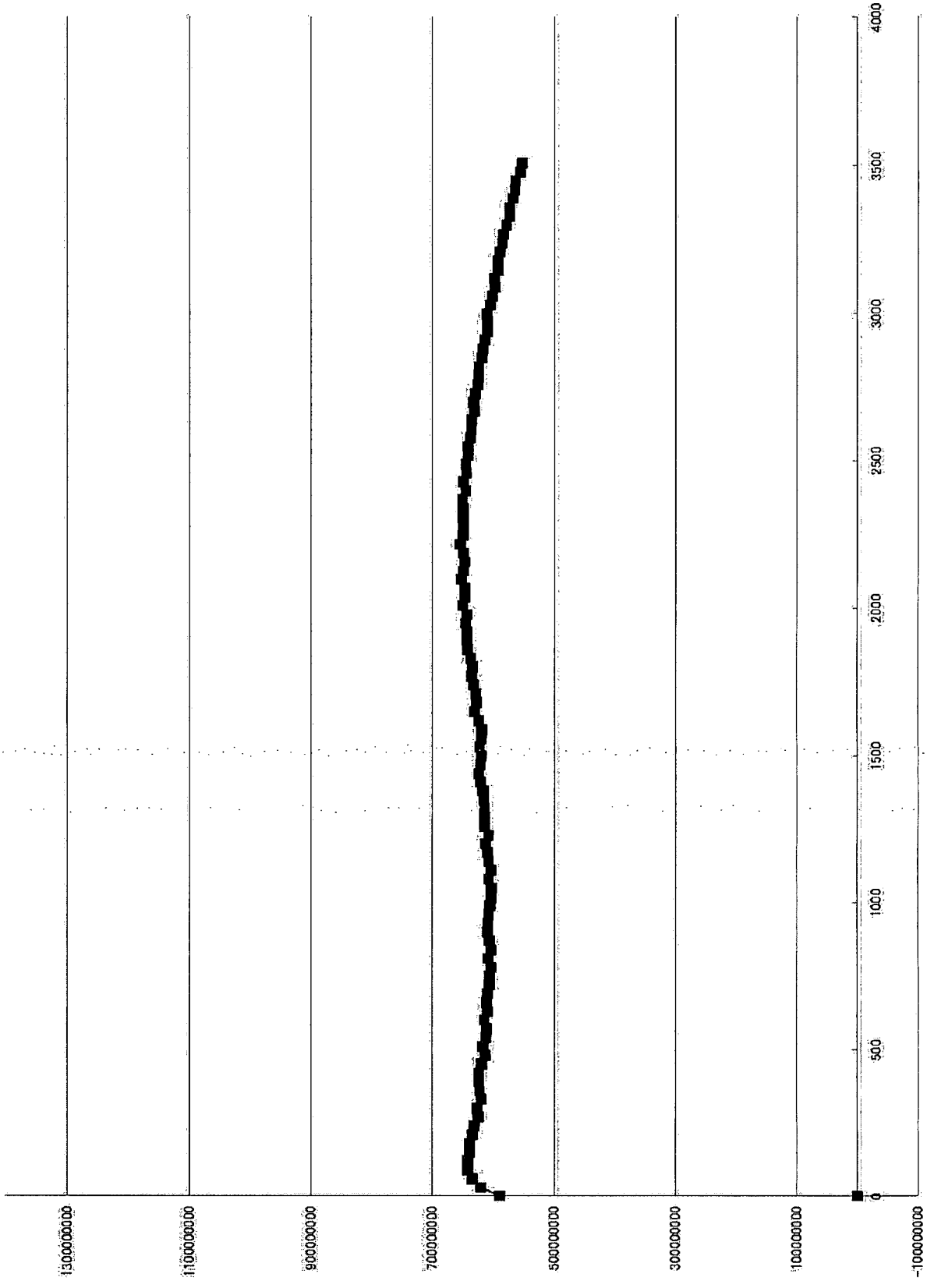
Fig. 39-47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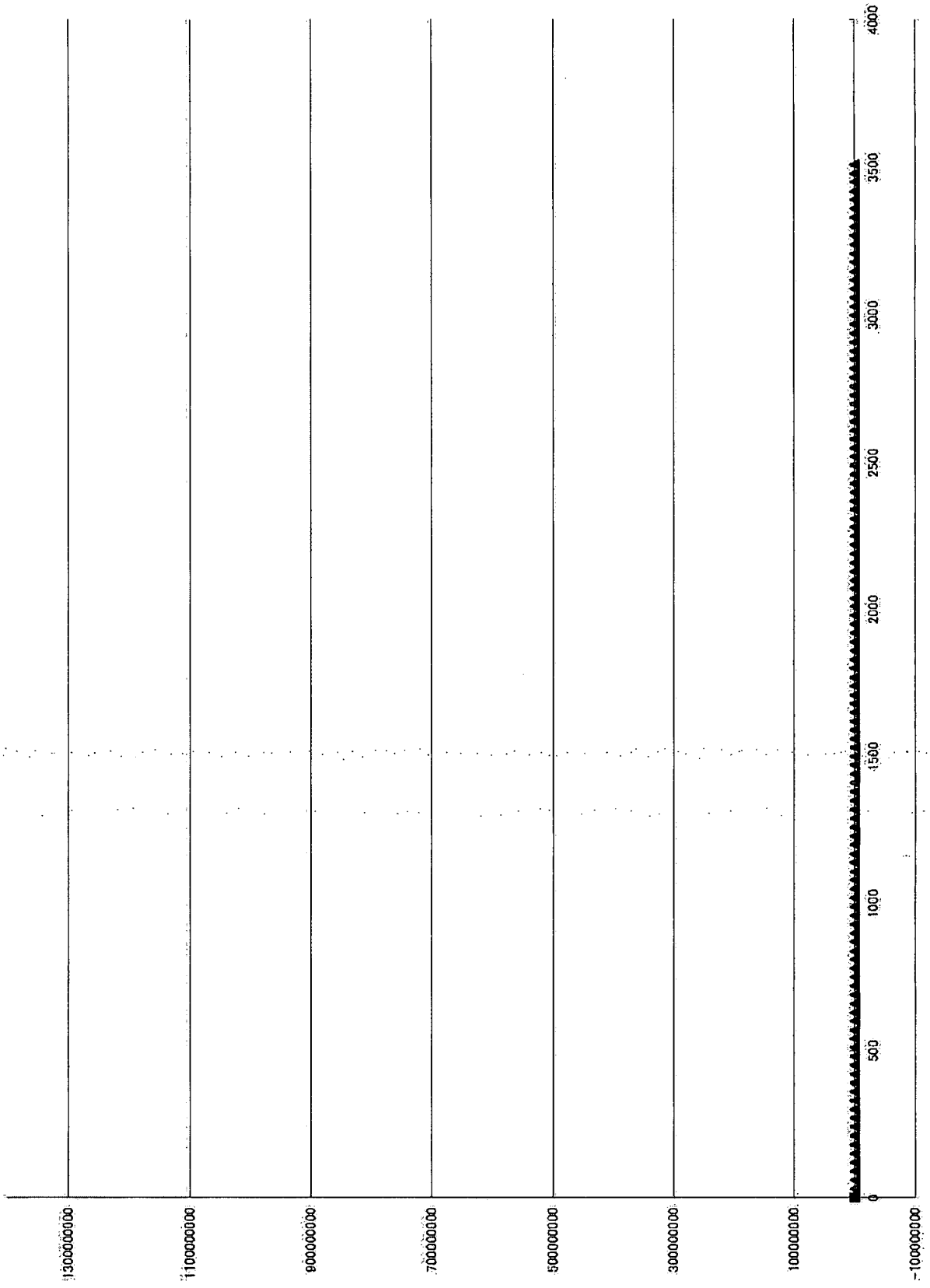
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Fig. 39-48

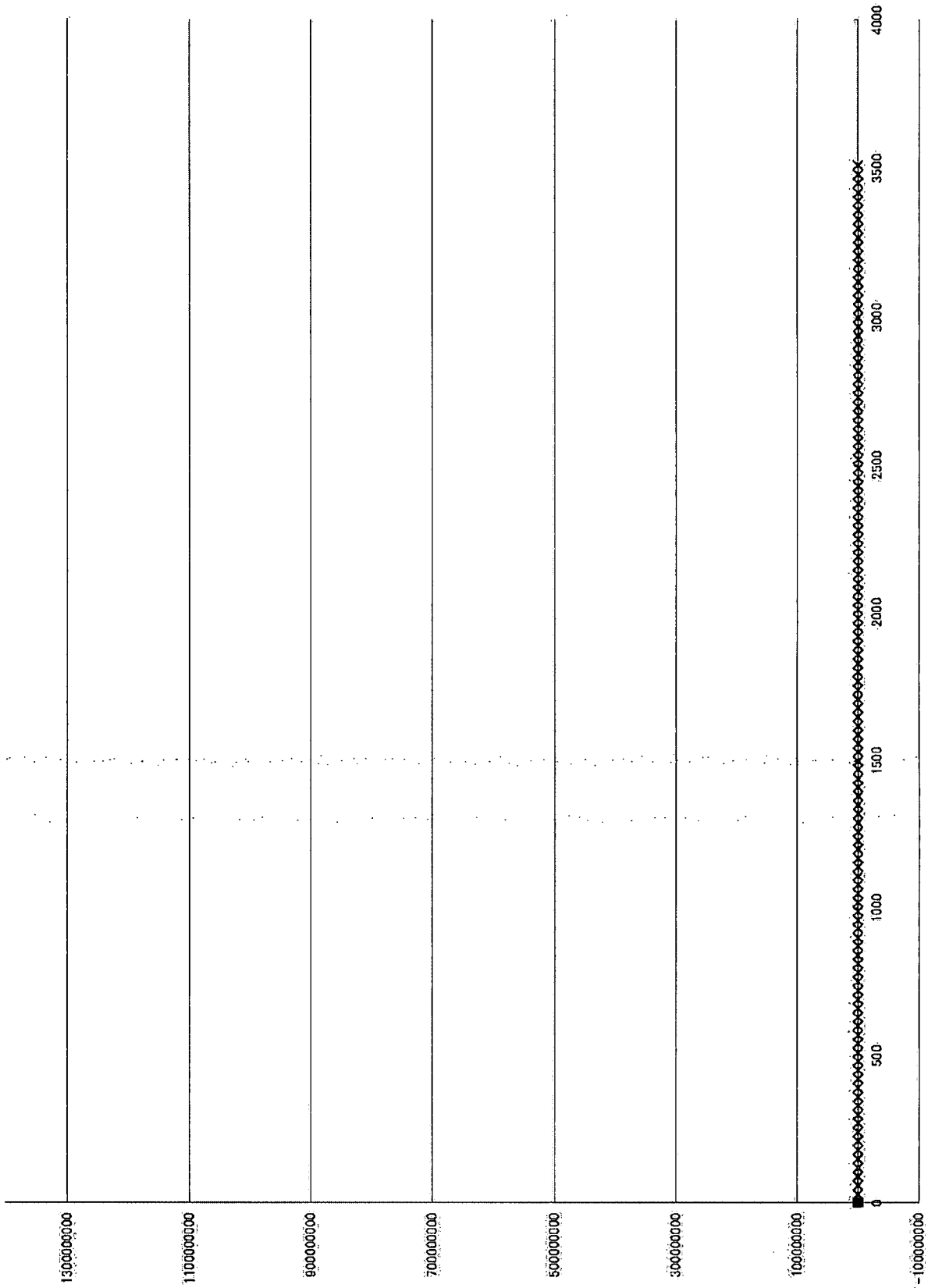
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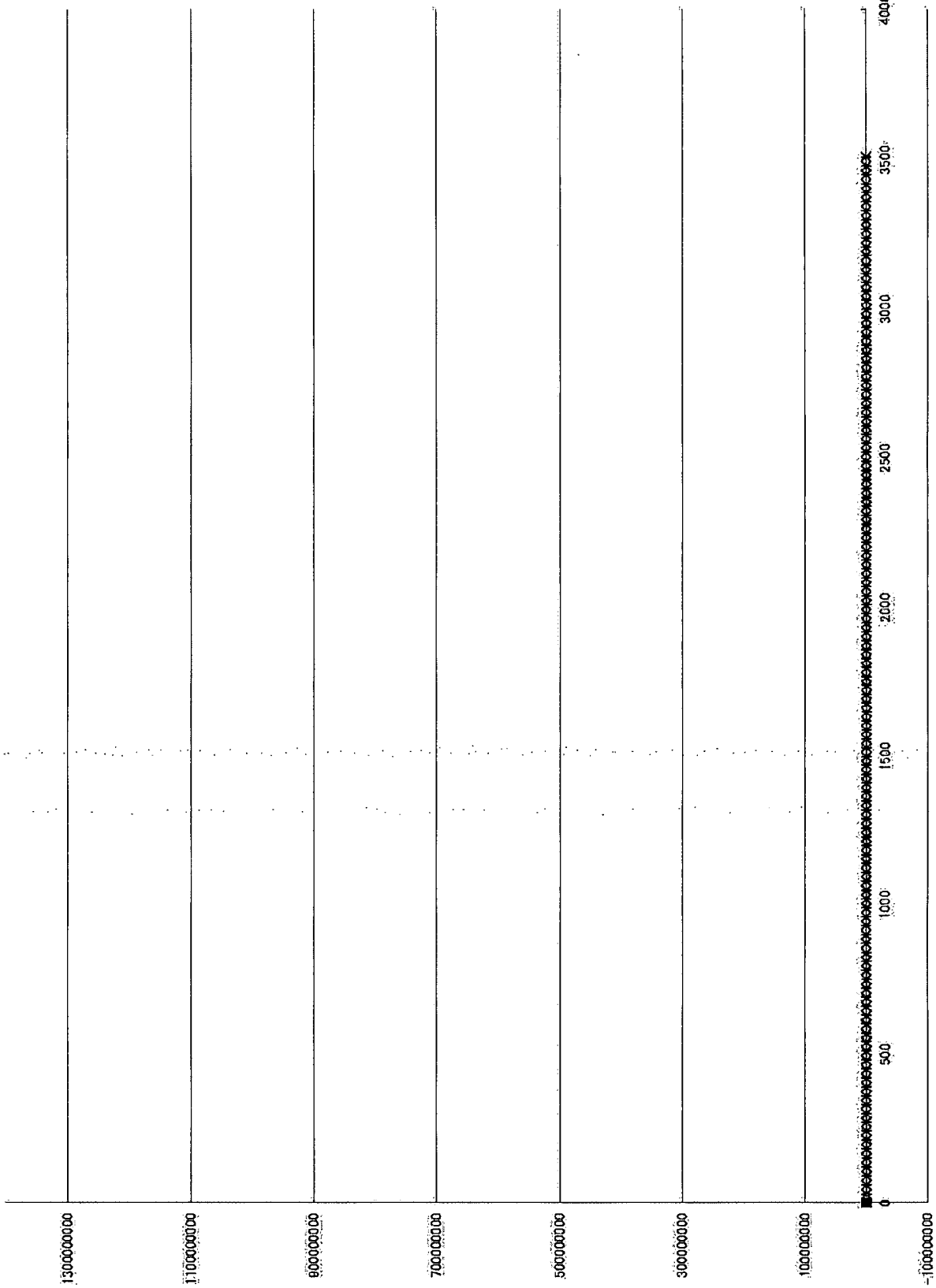
Fig. 39-49

Fig. 39-50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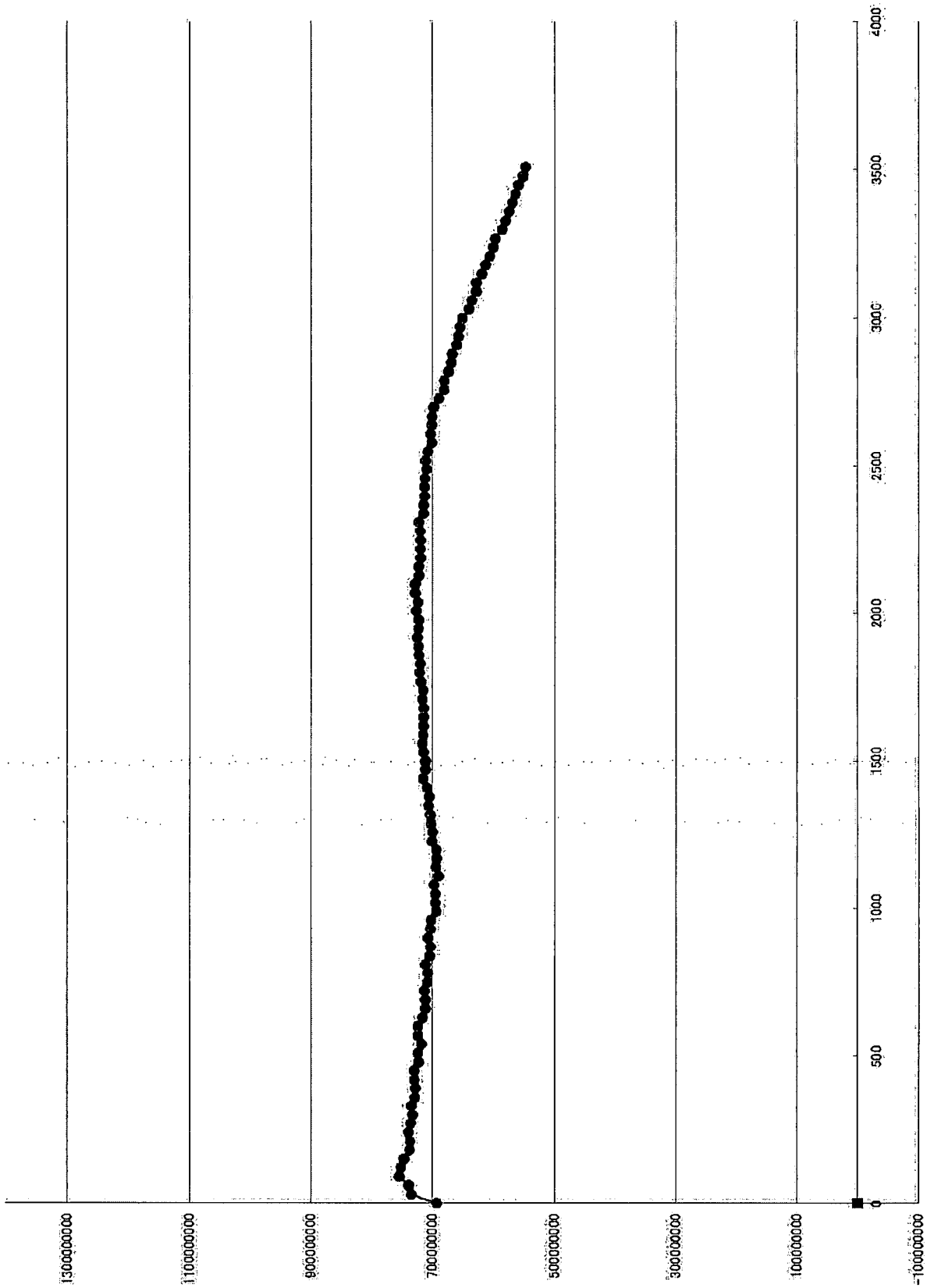
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Fig. 39-51

Fig. 39-52

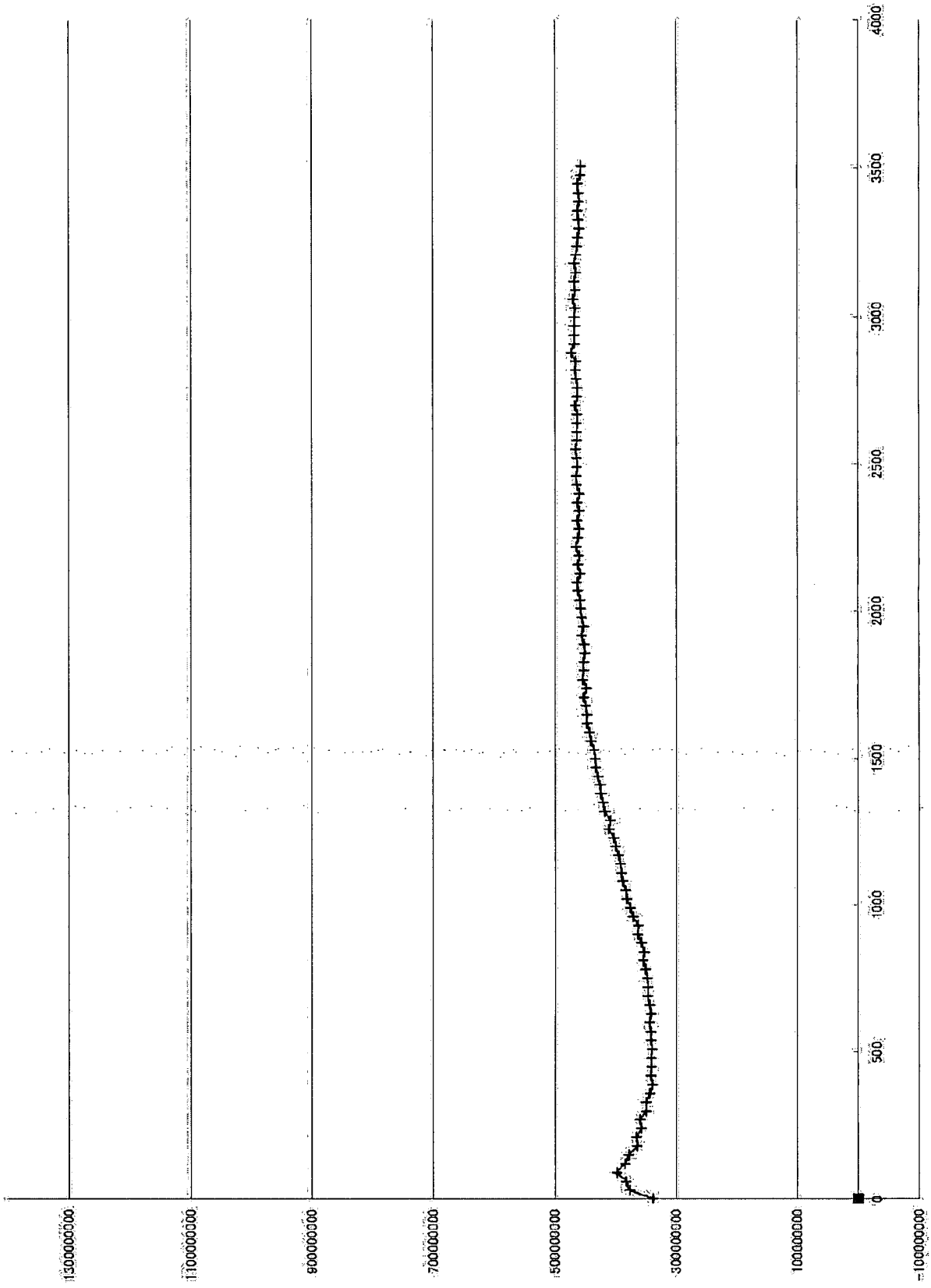
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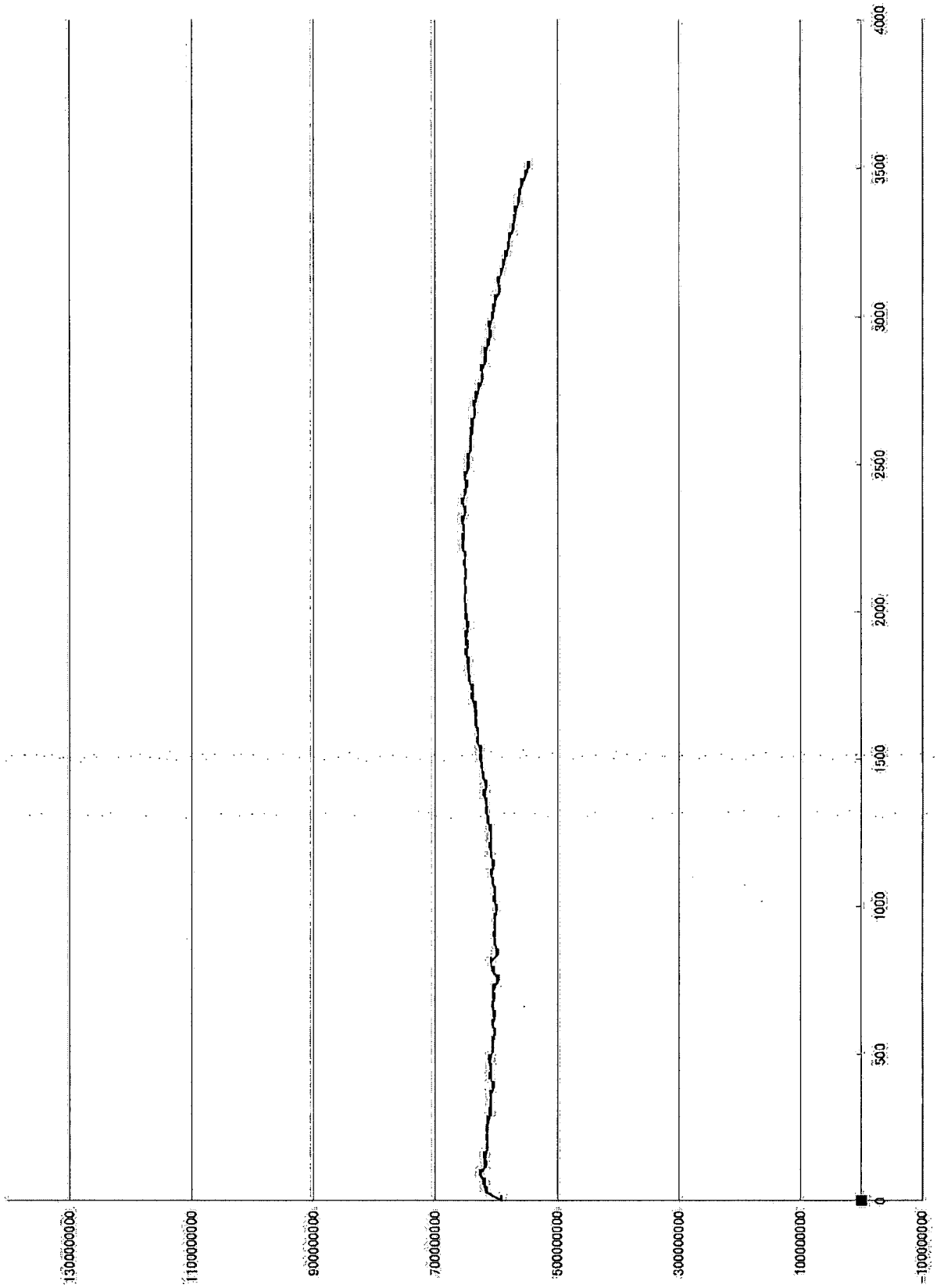
Fig. 39-53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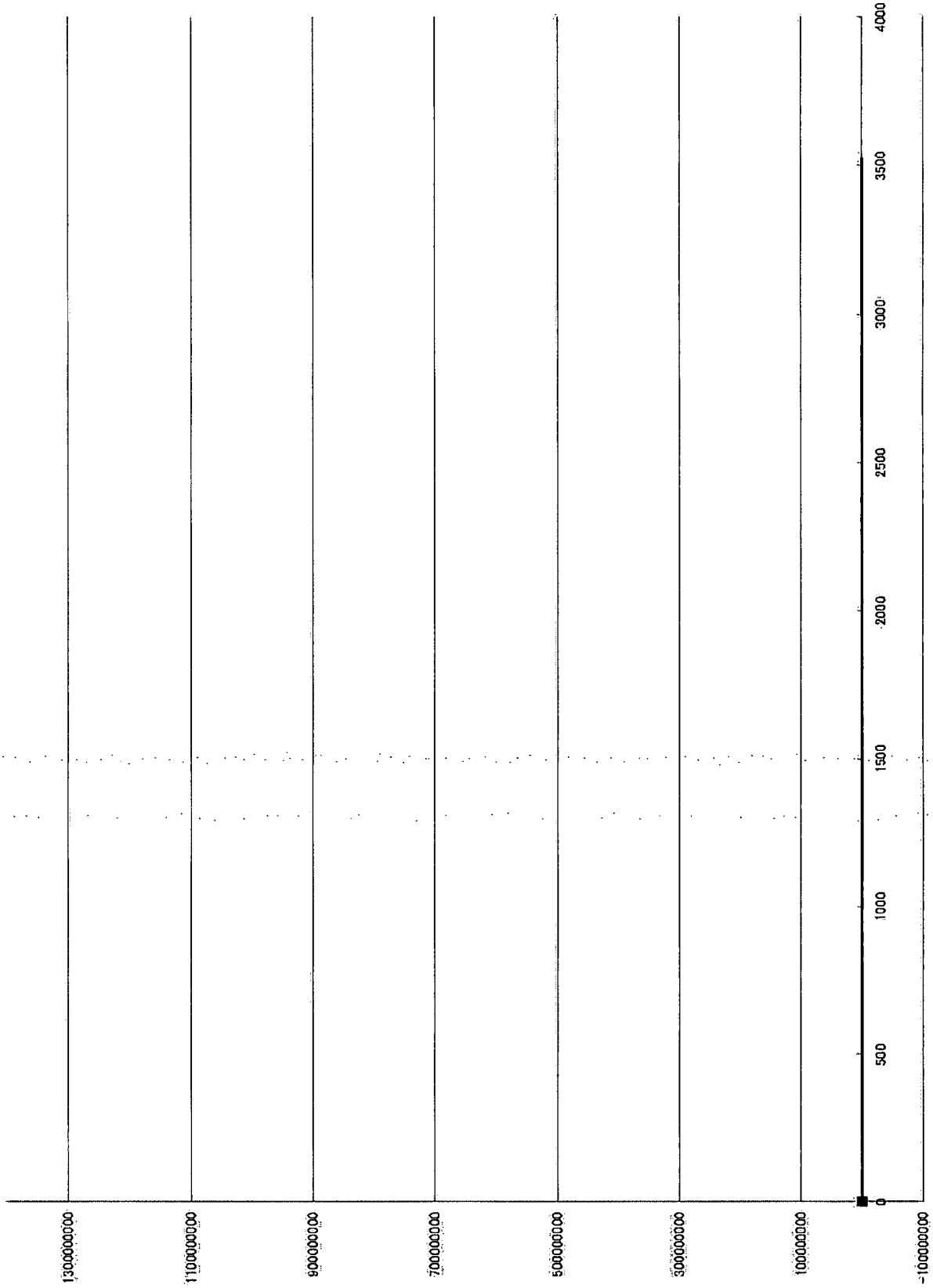
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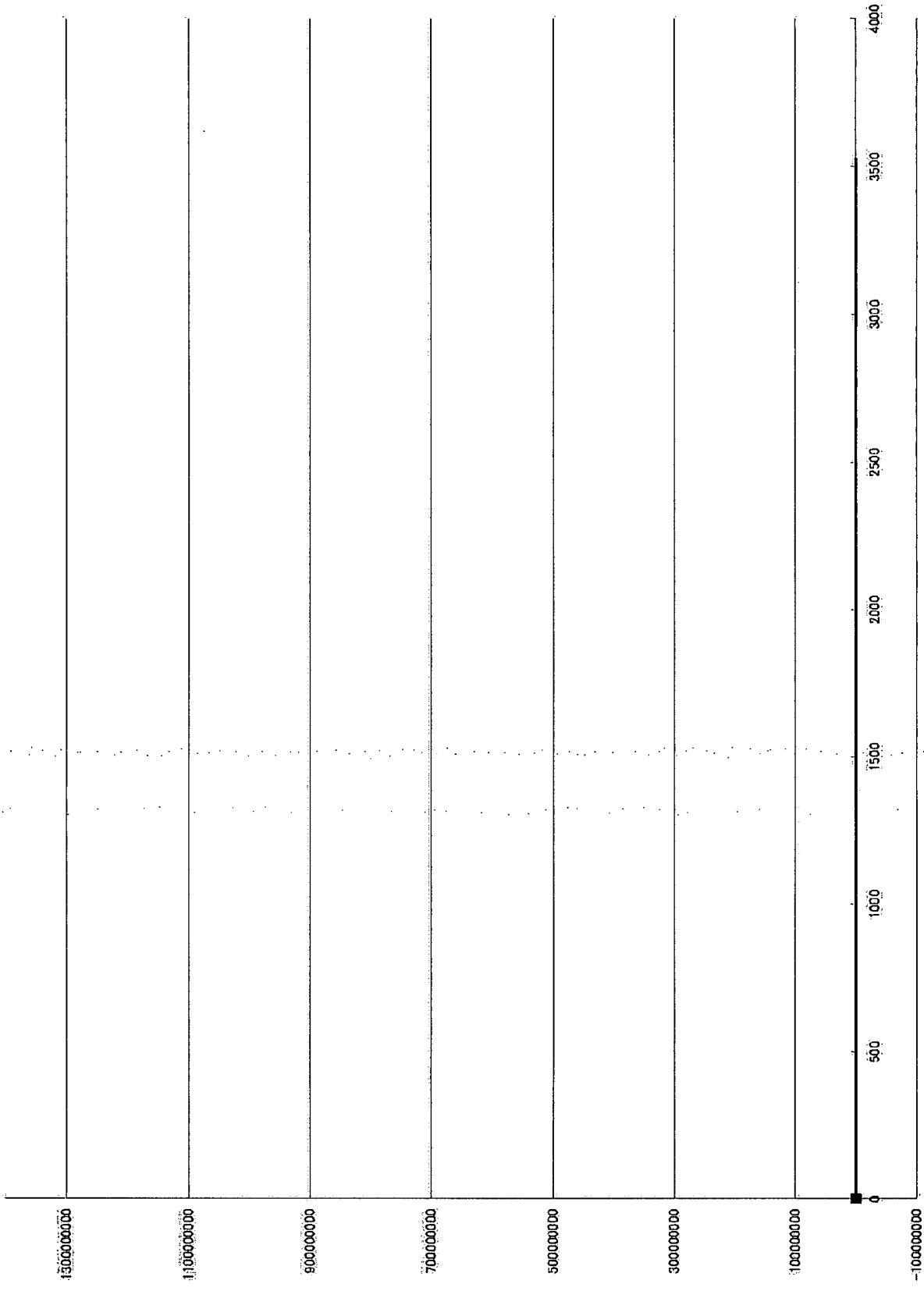
Fig. 39-54

Fig. 39-55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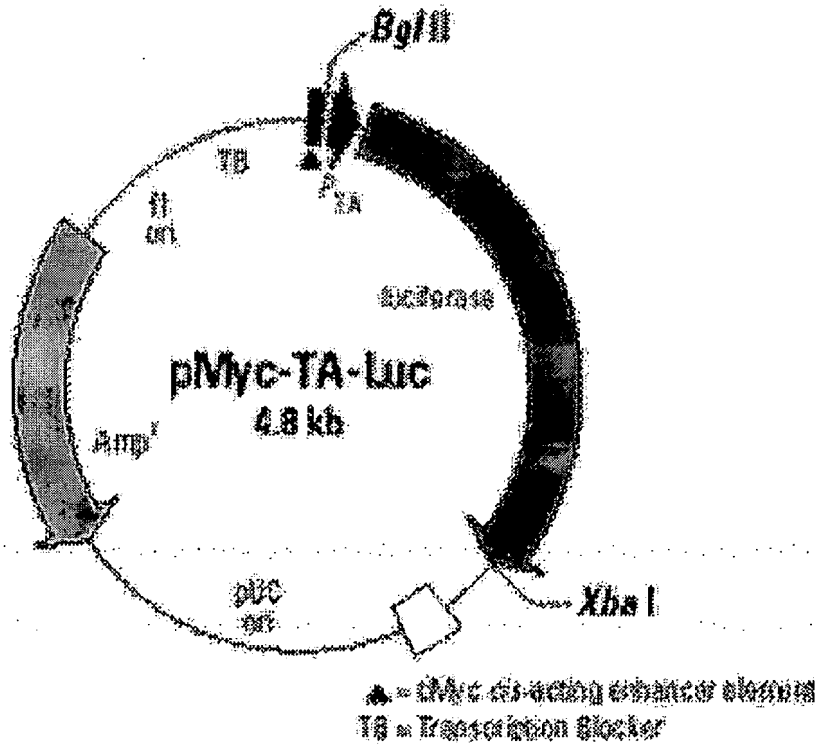
4000

Fig. 40


BglII
TB
pMyc-TA-Luc
4.8 kb
Luciferase
XbaI
= cMyc cis-acting enhancer elements
TB = Transcription Blocker

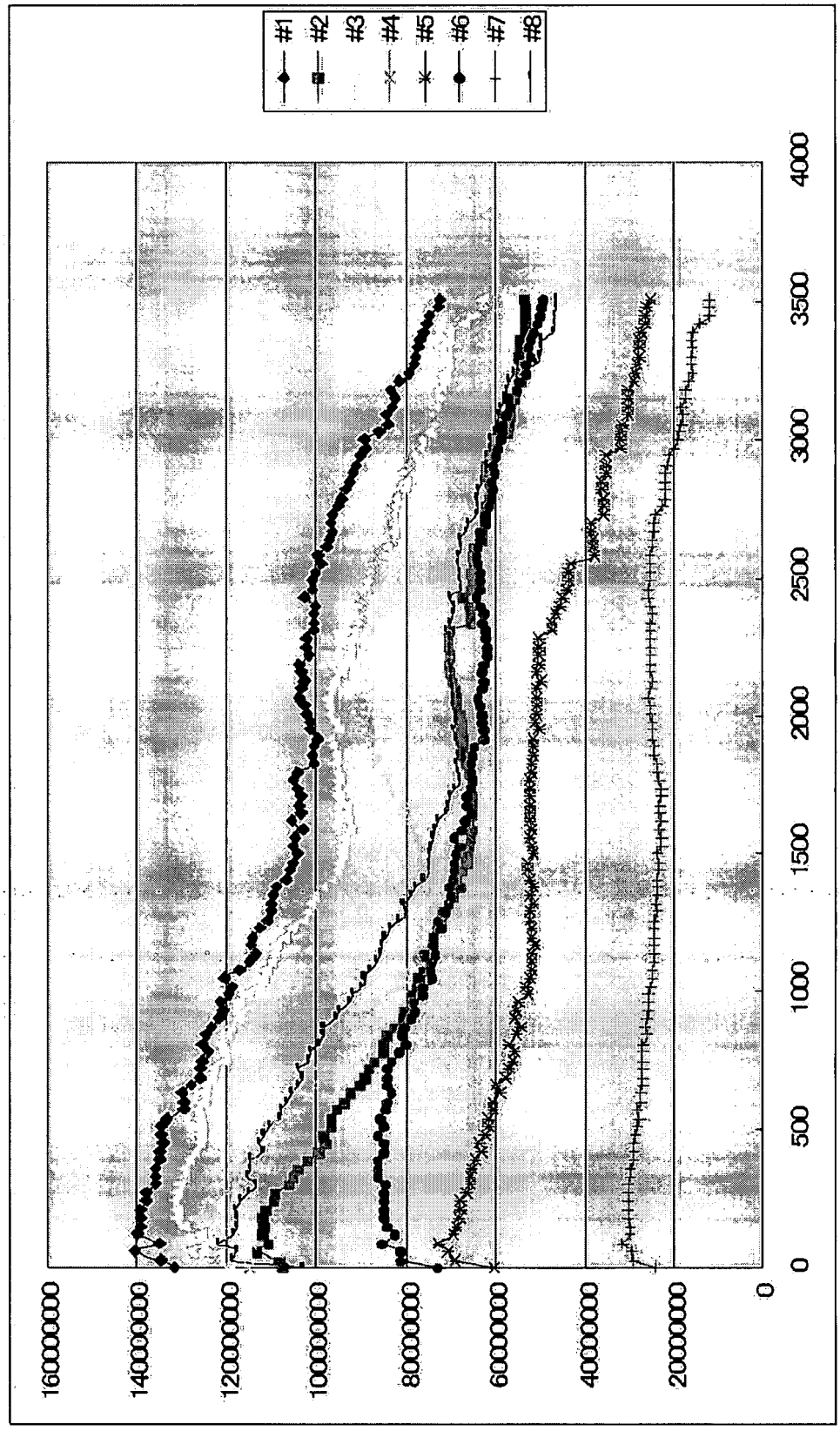

#1
#2
#3
#4
#5
#6
#7
#8
160000000
140000000
120000000
100000000
80000000
60000000
40000000
20000000
0
0
500
1000
1500
2000
2500
3000
3500
4000

Fig. 41

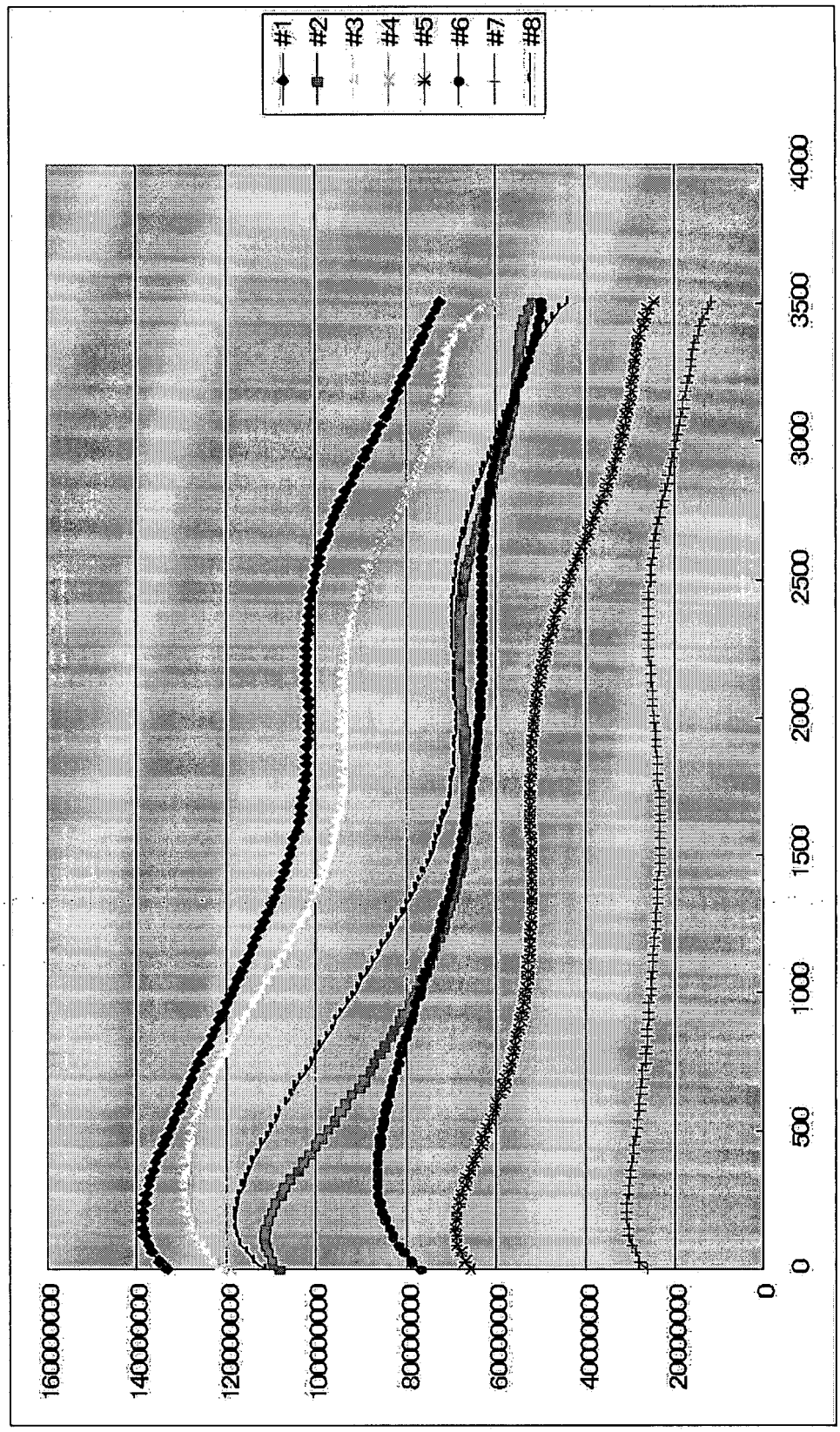
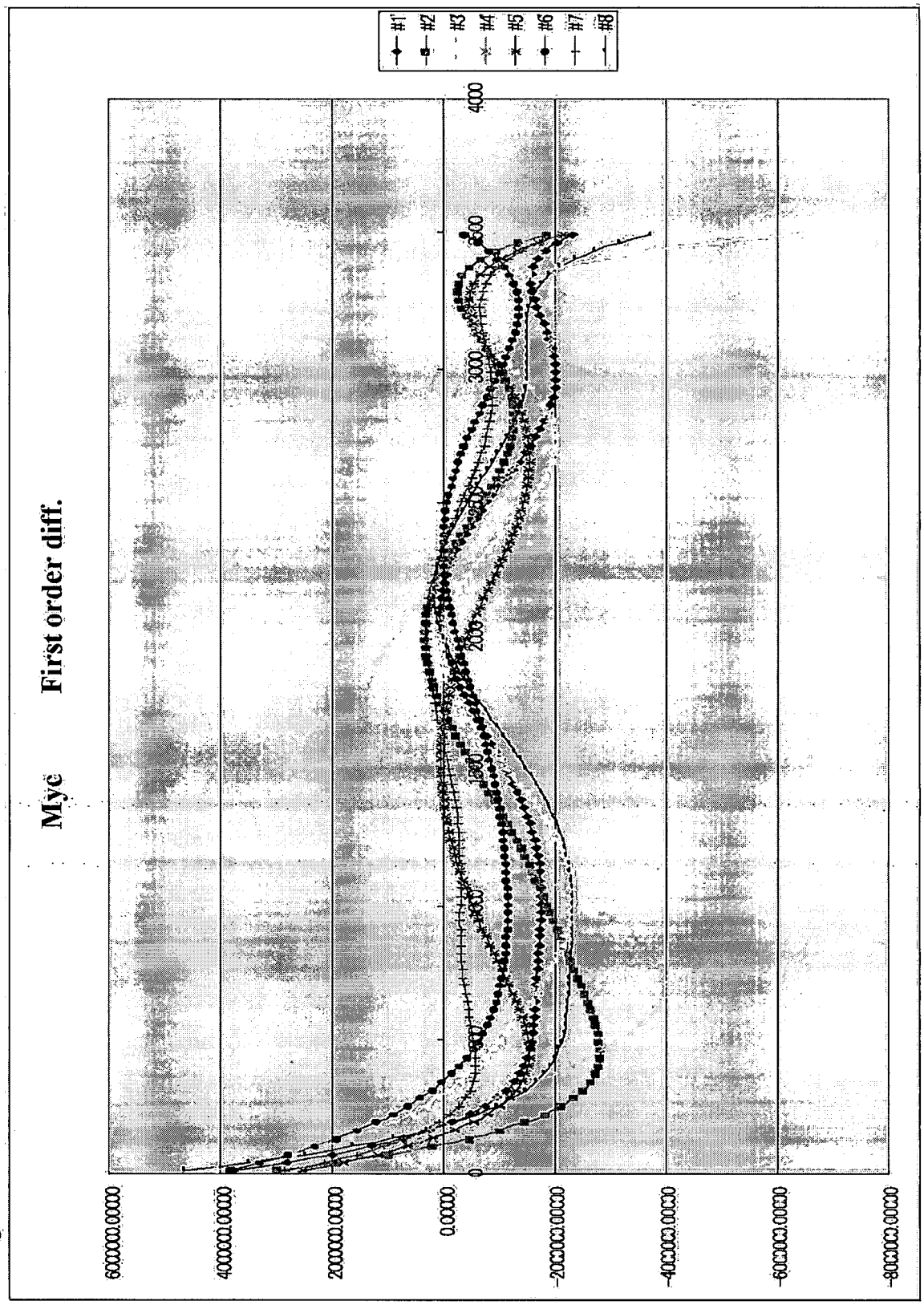

#1
#2
#3
#4
#5
#6
#7
#8
160000000
140000000
120000000
100000000
80000000
60000000
40000000
20000000
0
0
500
1000
1500
2000
2500
3000
3500
4000

Fig. 42

Fig. 43


Myc
First order diff.
#1
#2
#3
#4
#5
#6
#7
#8
6000000.00000
4000000.00000
2000000.00000
0.00000
-2000000.00000
-4000000.00000
-6000000.00000
-8000000.00000
0
1000
2000
3000
4000

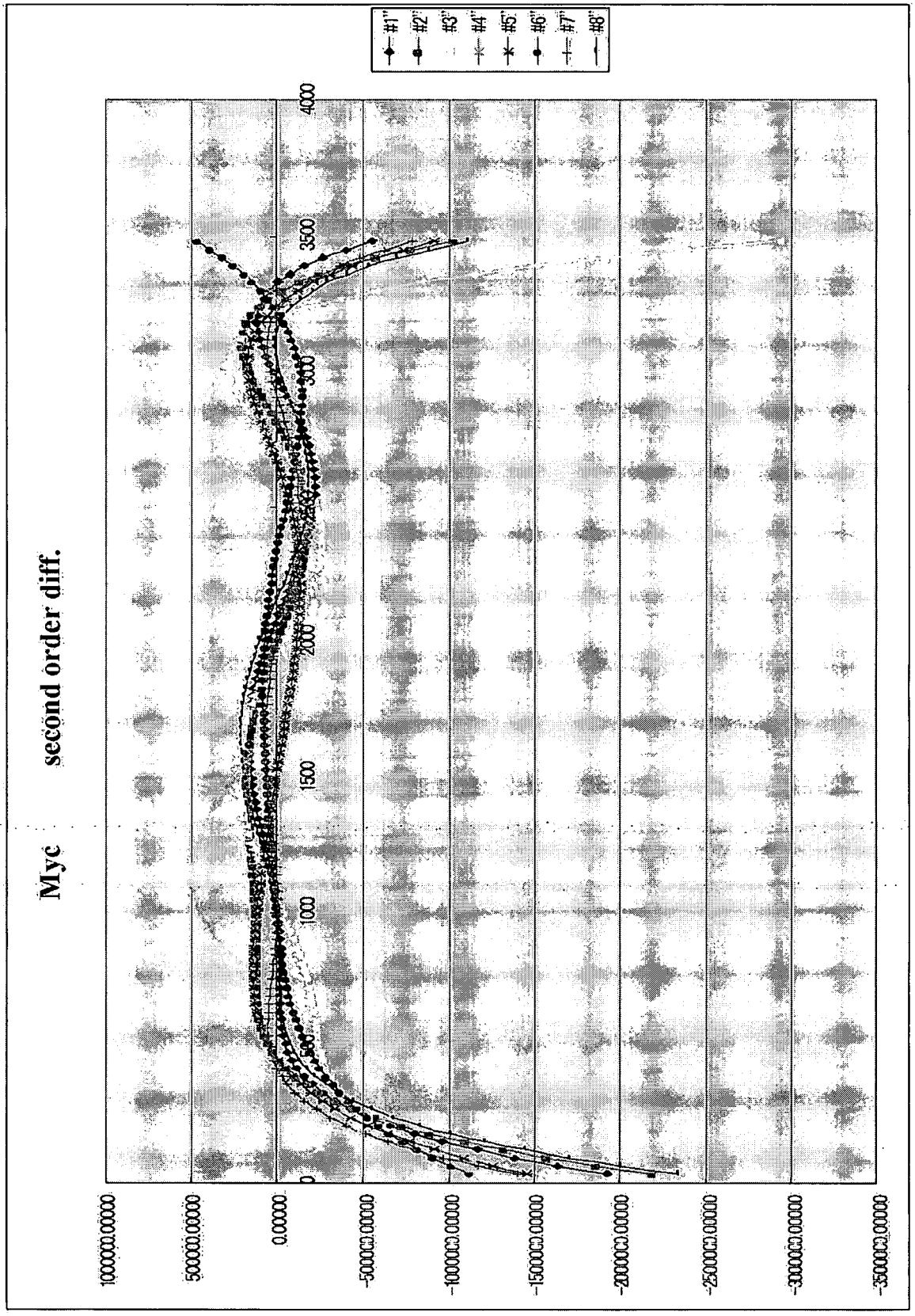

Myc second order diff.
#1
#2
#3
#4
#5
#6
#7
#8
0
500
1000
1500
2000
2500
3000
3500
4000
1000000.00000
500000.00000
0.00000
-500000.00000
-1000000.00000
-1500000.00000
-2000000.00000
-2500000.00000
-3000000.00000
-3500000.00000

Fig. 44

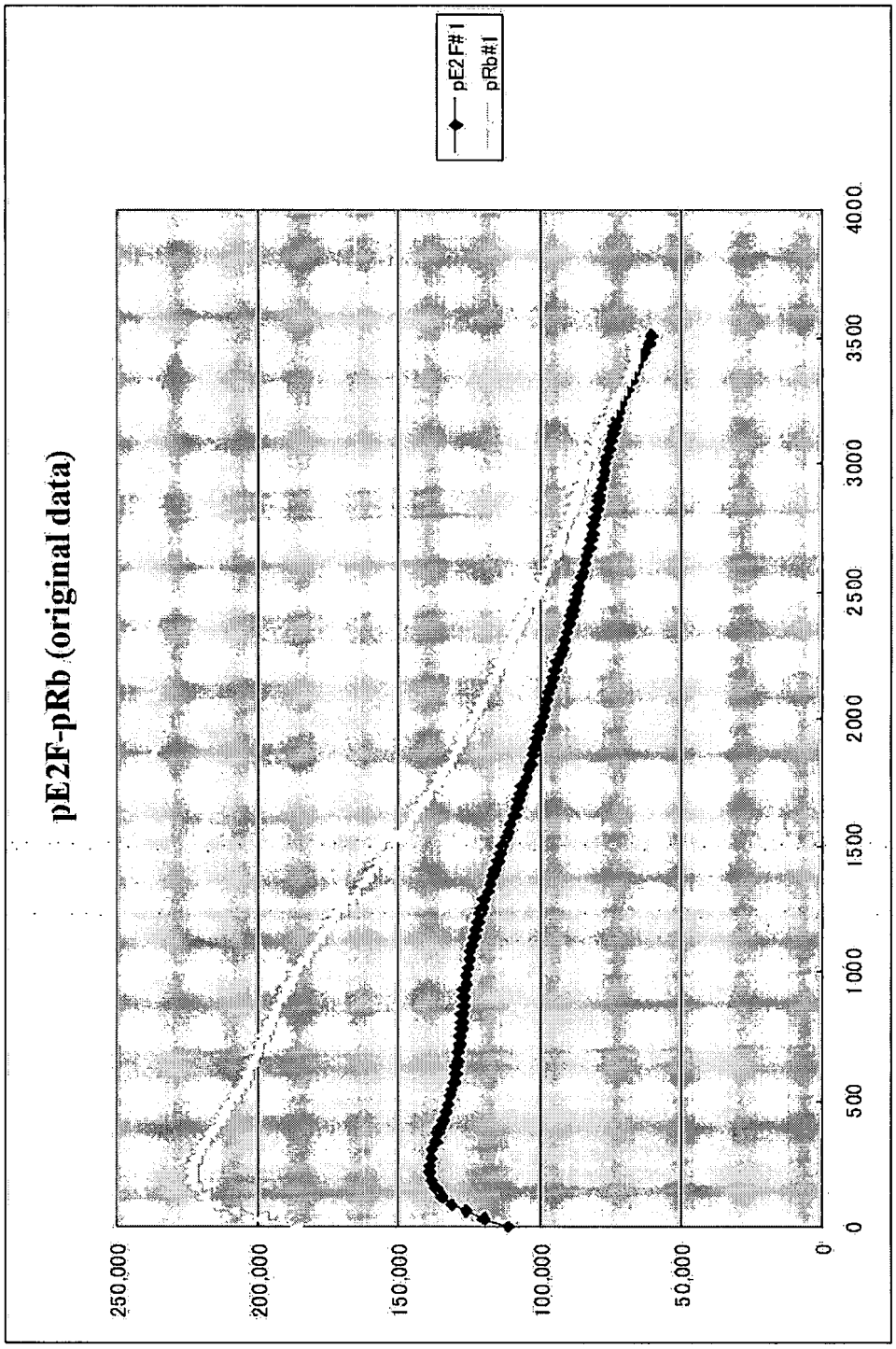
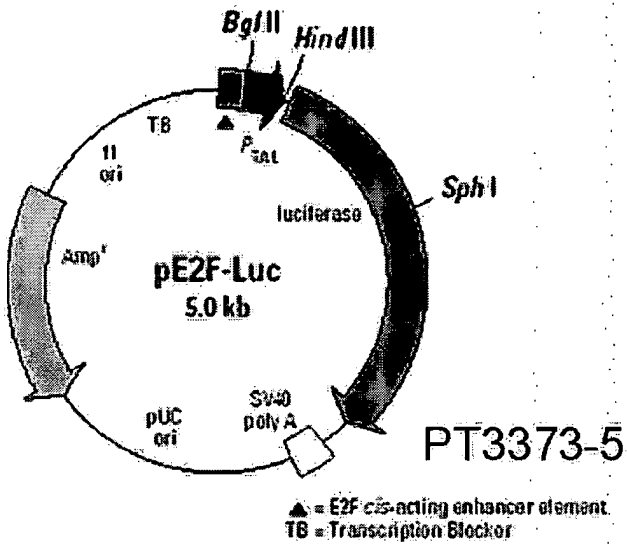

pE2F-pRb (original data)
pE2F#1
pRb#1
250,000
200,000
150,000
100,000
50,000
0
0
500
1000
1500
2000
2500
3000
3500
4000

Fig. 45

Fig. 46


BglII
HindIII
TB
f1 ori
P_{E2F}
luciferase
SphI
Amp^r
pE2F-Luc
5.0 kb
pUC ori
SV40 poly A
PT3373-5
▲ = E2F cis-acting enhancer element
TB = Transcription Blocker

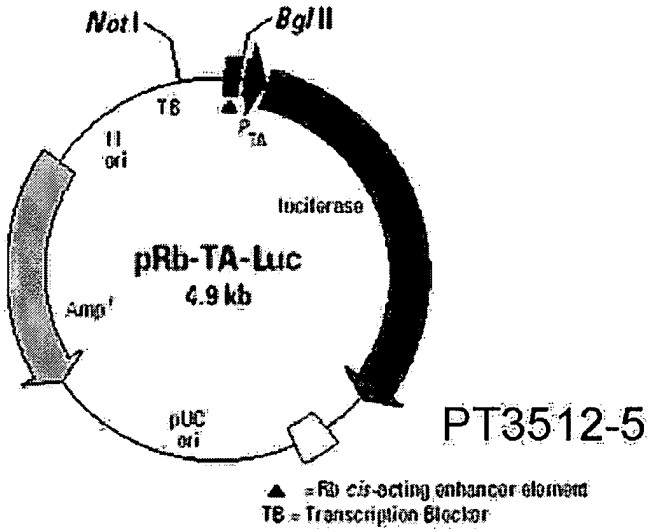

NotI
BglII
TB
f1 ori
P_{TA}
luciferase
pRb-TA-Luc
4.9 kb
Amp^r
pUC ori
PT3512-5
▲ = Rb cis-acting enhancer element
TB = Transcription Blocker

Fig. 47

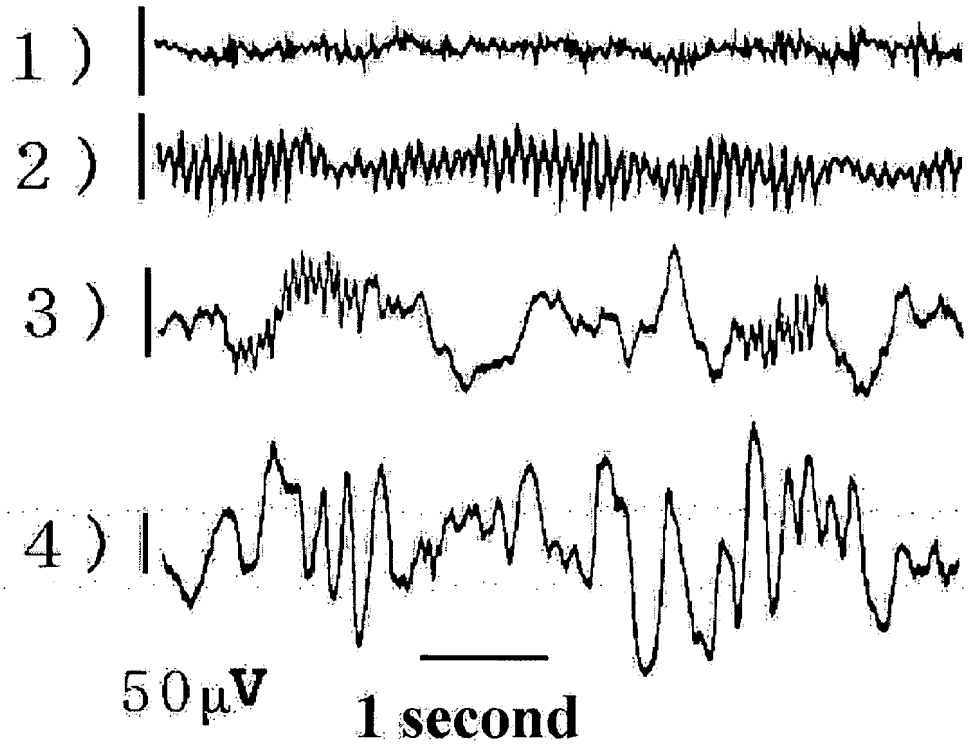
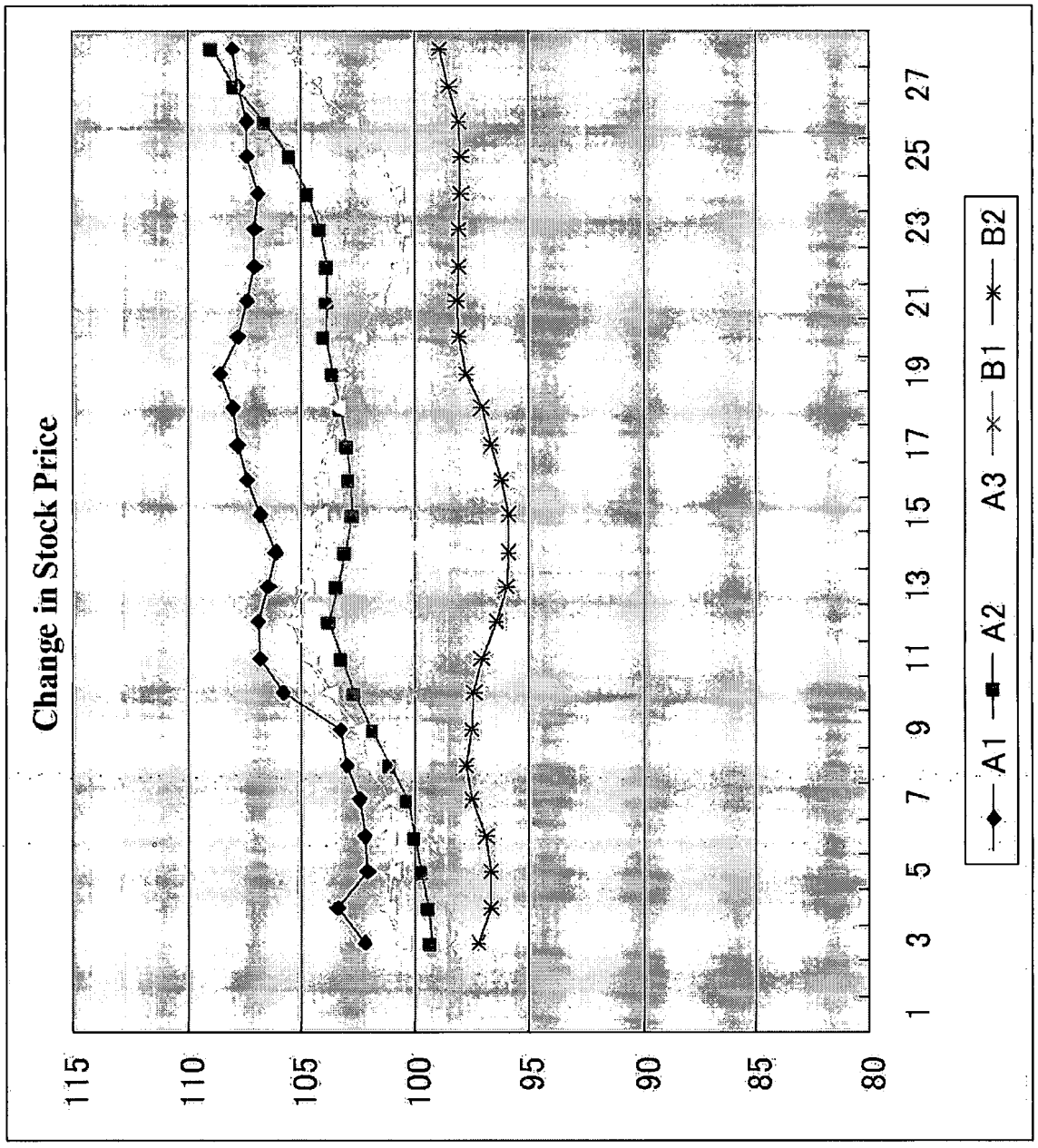


Fig. 48


Change in Stock Price
115
110
105
100
95
90
85
80
1
3
5
7
9
11
13
15
17
19
21
23
25
27
A1
A2
A3
B1
B2